iChem™
Automated Chemical Optimization

iCHEM™ ROC 107 USER MANUAL

INSTALLATION, SETUP, AND OPERATION

FOR USE WITH THE FLOBOSS™ 107 AND ROCLINK™ 800

Patent Pending

PCSFerguson™

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Revision History

Date	Description	Version
September 2014	Initial Release	1.0
July 2015	Dynamic Dosing, tFactor and Correctional Batch	2.0

1 Introduction

Purpose

This manual guides the user in installation, setup, calibration, and operation of the iChem™ ROC 107 chemical well tending application.

Audience

The iChem ROC 107 User Manual is intended for knowledgeable professionals in the natural gas well industry with flow management software experience.

Scope

Chapter 1 Introduction
Provides an overview of the system described in this manual.

Chapter 2 Software Installation
Provides step-by-step installation instructions for the ROCLINK 800 and iChem ROC 107 software.

Chapter 3 Setup and Calibration
Details the tasks required for customizing and testing your chemical injection system.

Chapter 4 Controls and Features
Lists and describes each input field and function in the iChem ROC 107 application.

Chapter 5 Common Tasks
Describes procedures for other useful options in the ROC 107 application.

Appendices
Contains additional wiring diagrams and troubleshooting information.

1.1 Abbreviations and Acronyms

DIN: Digital Input

DOUT: Digital Output

DP: Differential Pressure

EFM: Electronic Flow Meter

FB107: FloBoss 107, electronic flow computer

iChem™: Intelligent Chemical Pump, referring to the PCS Ferguson chemical injection system

I/O: Input/Output

LOI: Local Operator Interface

PC: Personal Computer

PD: Positive Displacement

PID: Proportional-Integral-Derivative

PLC: Programmable Logic Controller

RTU: Real Time Unit

TLP: Point Type, Logical number, and Parameter

1.2 Safety Overview and Symbols

This product and other chemical injection systems and components should only be operated by trained and experienced personnel. Accidents can result in damage to equipment, chemical spills, loss of natural gas, or other unintended consequences.

This manual contains Caution and Warning-related text to alert the user to potential hazards:

CAUTION	*A Caution box indicates a potential for damage to equipment, loss of data, or interruption of essential processes.*

WARNING	*A Warning box indicates likely damage to equipment or loss.*

1.3 System Overview

The iChem ROC 107 application is designed to integrate with the Emerson™ ROCLINK™ 800 (ROCLINK) configuration software and the Emerson™ FloBoss™ 107 (FB107) flow manager.

NOTE *For more details regarding the FloBoss 107 or ROCLINK 800, refer to the appropriate Emerson documentation at http://www2.emersonprocess.com/en-US/brands/roc/software/roclink800/Pages/roclink800.aspx.*

1.3.1 FloBoss Hardware

ROCLINK and iChem ROC 107 run with the FloBoss flow manager hardware. The FloBoss 107 attaches to the outside of the pump and manages the injection volume and timing of the well. The box has an LCD screen for basic operations.

The junction box wiring configuration determines the parameters for later mapping of the TLP points and other set up tasks.

The images shown in Figure 1.1 and Figure 1.2 are examples. Your hardware setup may look different.

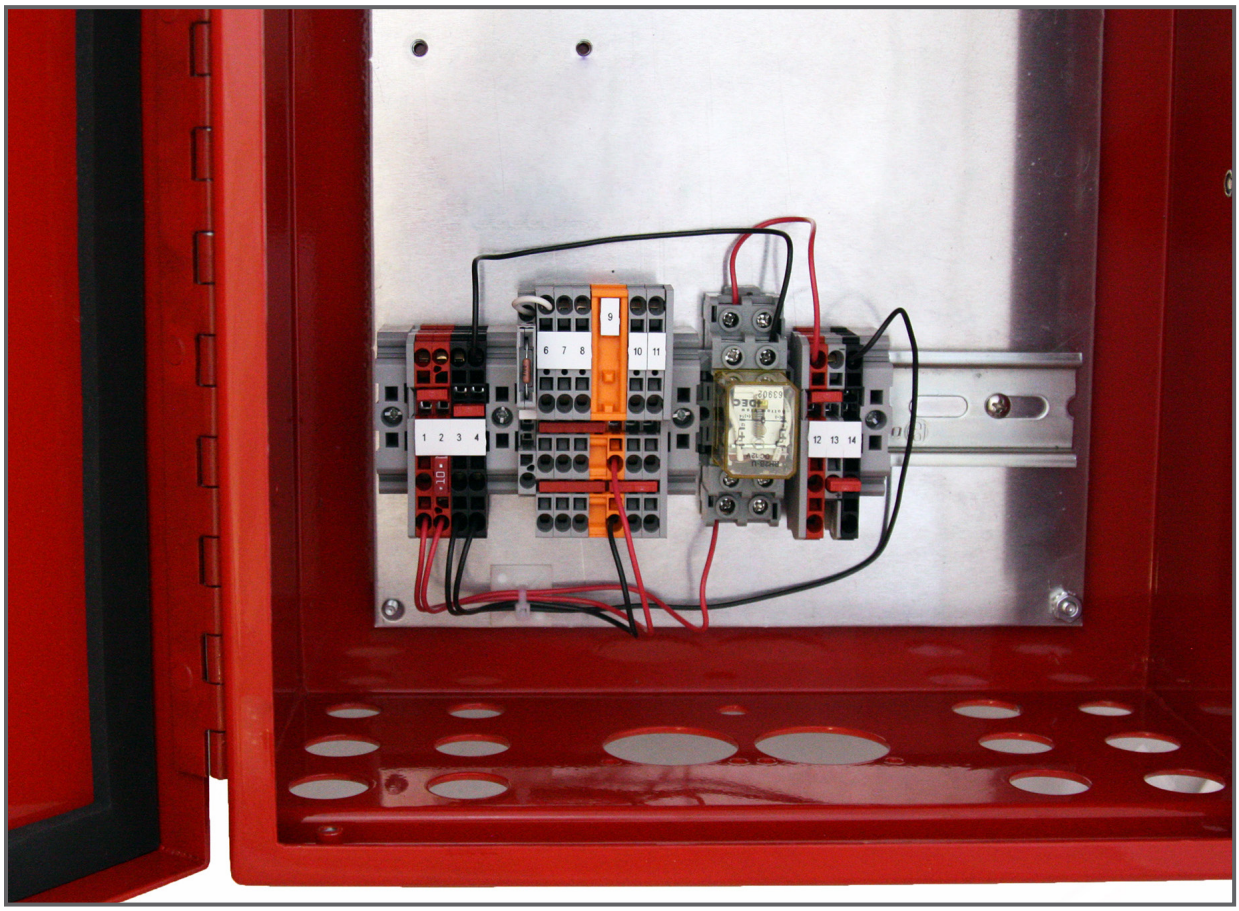


Figure 1.1 *Example of Standard Junction Box Wiring*

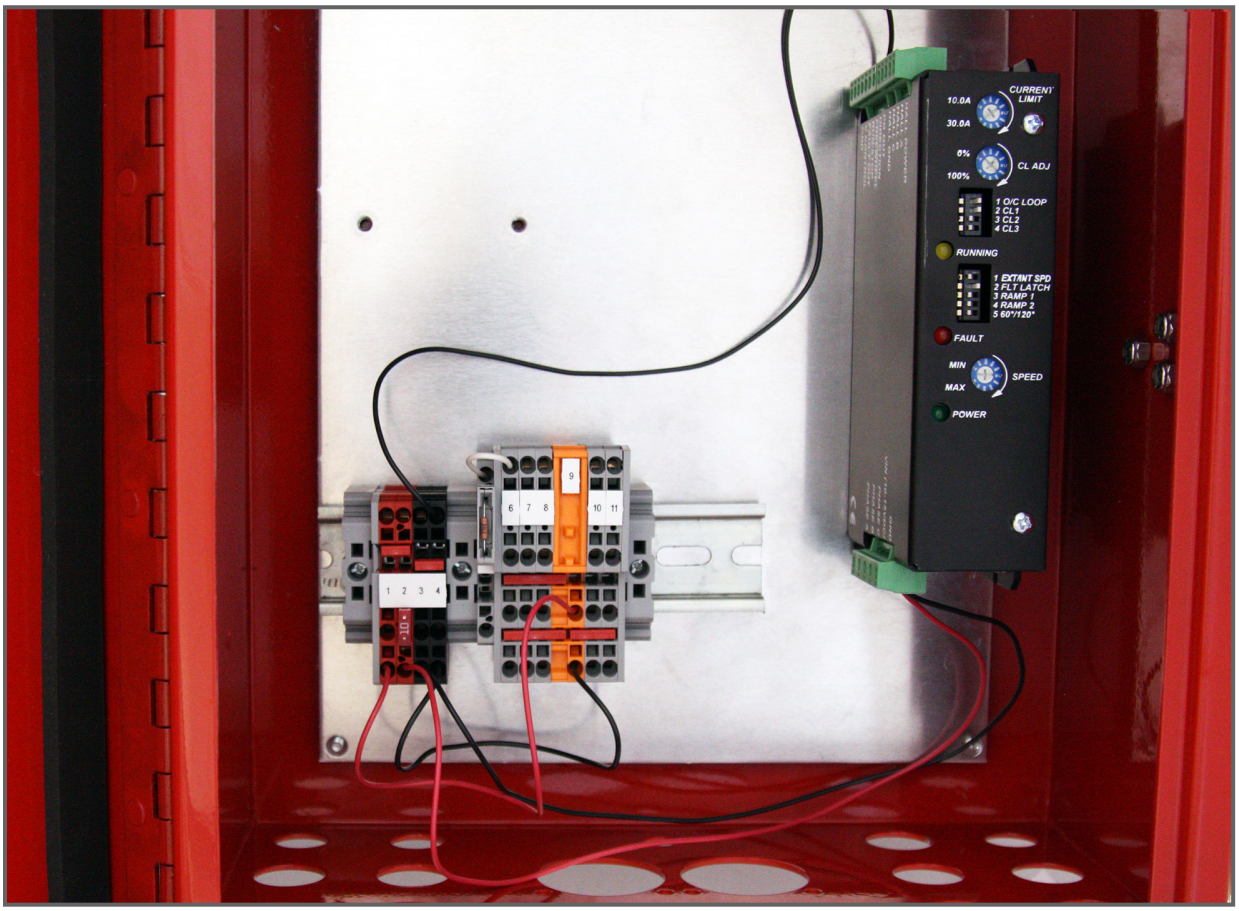


Figure 1.2 *Example Junction Box Wiring with a Motor Control Board*

See example wiring diagrams in Appendix A.

1.3.2 ROCLINK™ 800 User Interface

ROCLINK 800 configuration software allows a remote user to monitor, configure, and calibrate the FB107. ROCLINK also enables off-line management of gas meters, I/O, and Proportional-Integral-Derivative Feedback Control Loops (PIDs).

The ROCLINK user interface displays the modules installed in the FB107 backplane.

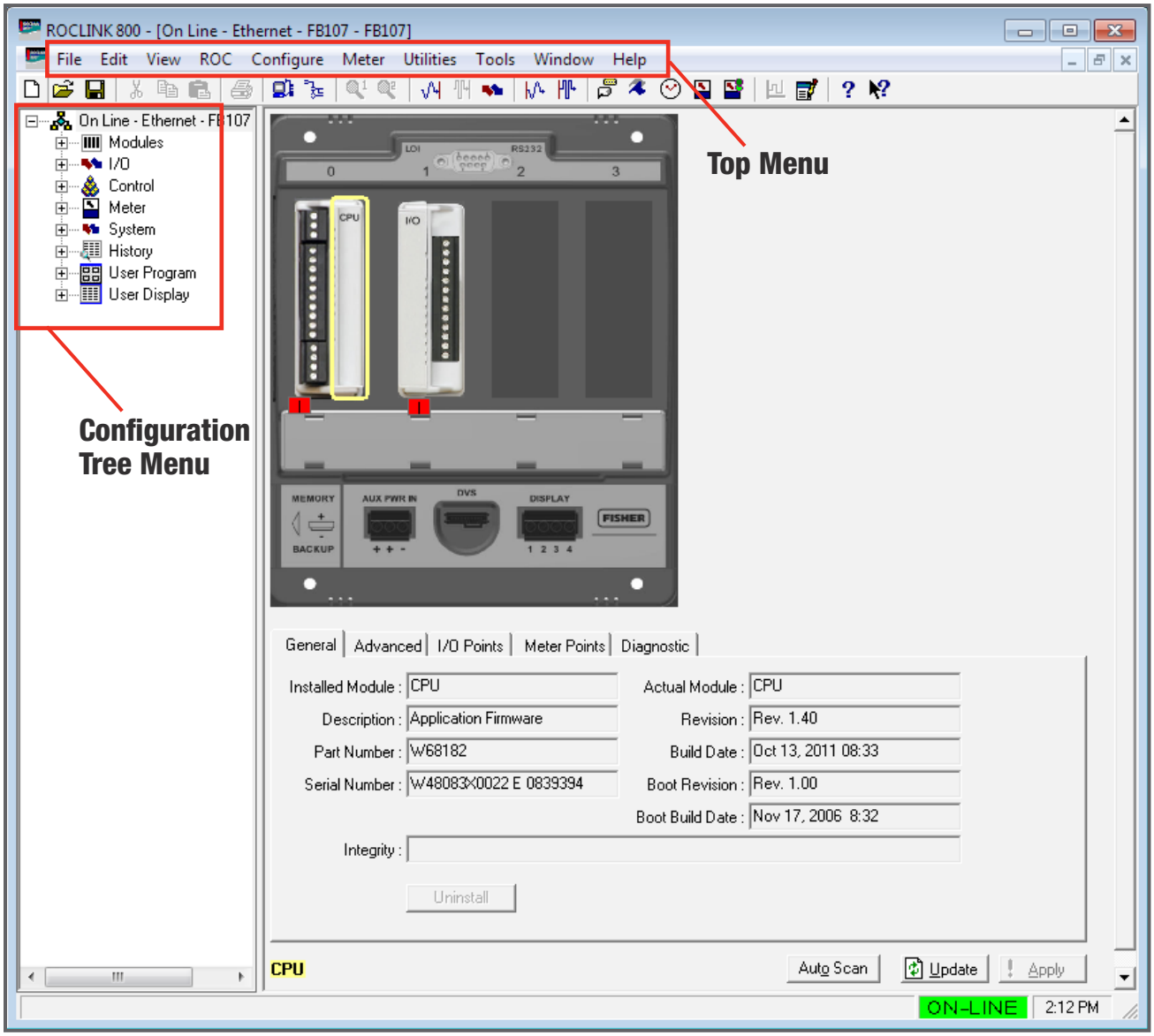


Figure 1.3 *ROCLINK 800 User Interface*

Double-click I/O items or modules in the **Configuration Tree Menu** to manage I/O types.

Use the **Top Menu** to set up your ROCLINK software for your system.

If necessary, you can adjust the display of TLP points from text to numerical in the ROCLINK menu.

1. In the **Top Menu**, click **Tools > Options.**
2. Under **Display TLP**, select **As Number**.

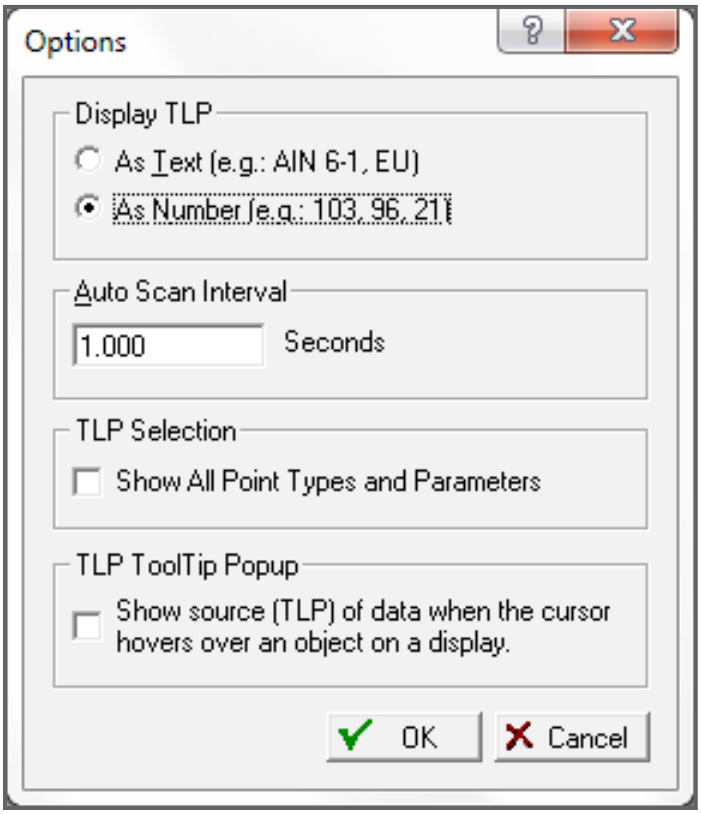


Figure 1.4 *ROCLINK 800 Options Dialog Box*

1.3.3 iChem™ ROC 107 User Interface

The ROC 107 application lets the user set chemical injection timing and volume. Once in AUTO mode, the application measures and monitors flow injection volumes and adjusts each cycle based on previous measurements. iChem ROC 107 can be used with any pump. However, each ROC 107 version is custom-built for the system and module slot.

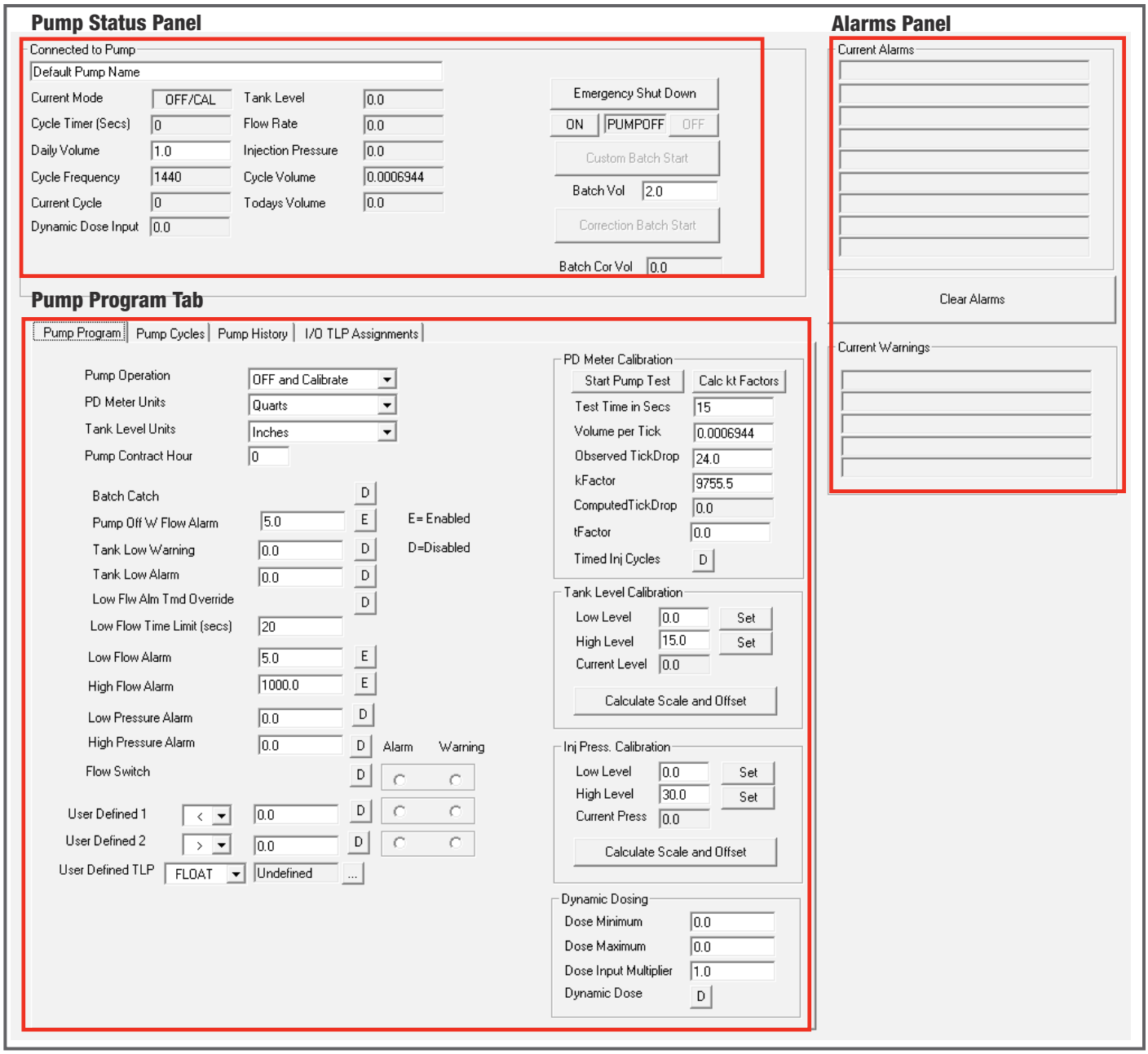


Figure 1.4 *iChem ROC 107 User Interface*

Click the **Apply** button to save your changes, and click **Update** to refresh the screen and meter readings.

Clicking **AutoScan** updates all readings every second by default.

2 Software Installation

The ROCLINK™ 800 software must be installed and connected to a communication device.

NOTE *Consult your FloBoss 107 and ROCLINK 800 user documentation for additional information not included in this manual.*

2.1 Installing ROCLINK™ 800

To install ROCLINK from a CD-ROM:

1. Insert the disk into your PC and follow in the installation wizard instructions.
2. If any "User Account Control" messages appear, click **Yes** to allow ROCLINK to install.
3. Restart your PC when prompted to complete the installation.

To install ROCLINK 800 from a .zip file:

1. Extract all files in the .zip folder, and save the ROC folder in an appropriate location on your PC.
2. Open the ROC folder and ROCLINK sub-folder.
3. Locate and open the **setup** file.
4. Follow the instructions in the Installation Wizard.
5. If any "User Account Control" messages appear, click **Yes** to allow ROCLINK to install.
6. Restart your PC when prompted to complete the installation.

2.1.1 Logging in the First Time

ROCLINK automatically creates a shortcut on your desktop.

1. To start ROCLINK, double-click the shortcut or locate the program in your **Start** menu.

Figure 2.1 *ROCLINK 800 Shortcut*

For more information on the ROCLINK 800 application, visit the following link:
http://www2.emersonprocess.com/en-US/brands/roc/software/roclink800/Pages/roclink800.aspx

2. Open the ROCLINK application.

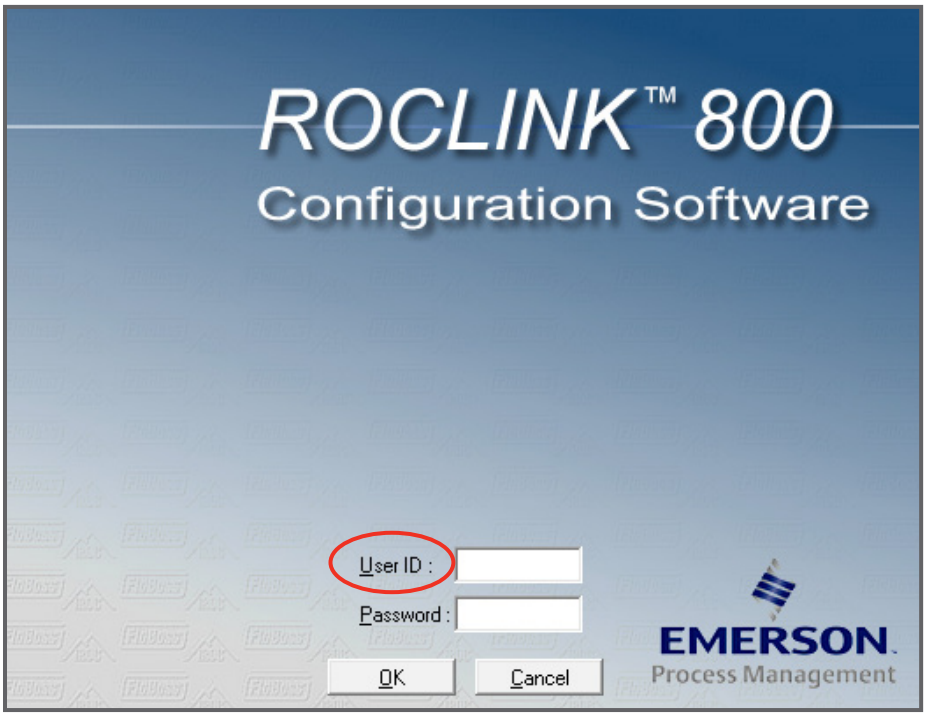


Figure 2.2 *ROCLINK 800 Login Screen*

3. When the login screen appears, type your **User ID** and **Password**, and then click **OK**.

   If you do not have an individual user id and/or password, click the **User ID:** text to automatically log in with the default credentials (ID: “LOI” and Password: “1000”).

4. Locate the correct communication device for your FloBoss 107 configuration in the ROCLINK Device Directory.
5. Right-click on the device’s corresponding PC port, and click **Properties**.

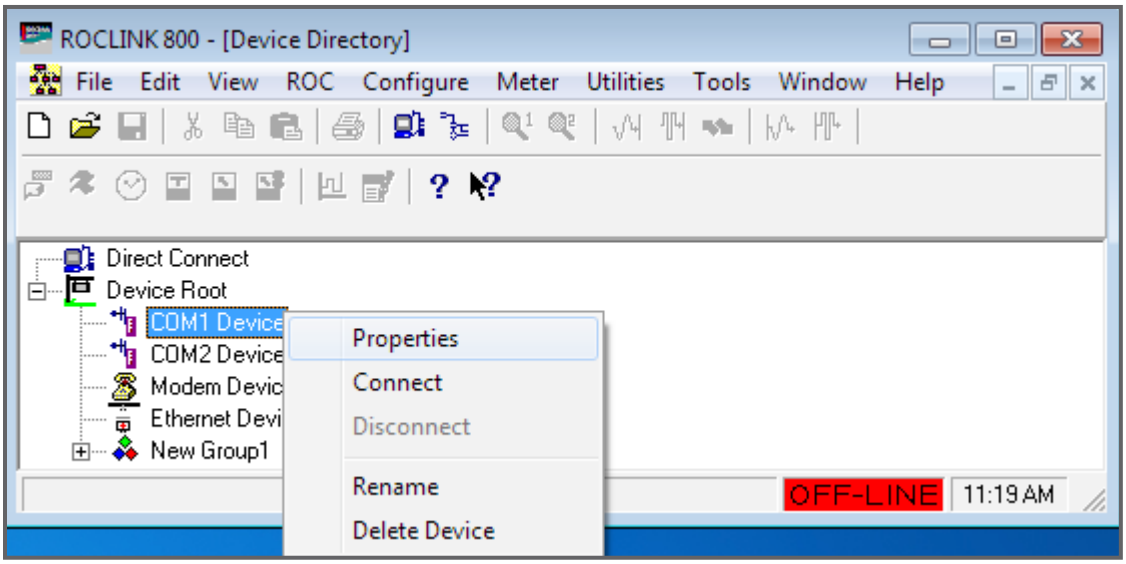


Figure 2.3 *ROCLINK 800 Device Directory*

6. Define **Communication Parameters** as necessary for your system.

   The green Online indicator will replace the red Offline field on the ROCLINK interface when you are successfully connected.

2.2 Loading iChem ROC 107

The FloBoss 107 allows up to six (6) user program slots. Loading the iChem ROC 107 application requires the .bin file.

To install iChem ROC 107:

1. If necessary, extract the .bin file and save it in an appropriate location on your PC.
2. Start ROCLINK800 and connect to the FloBoss 107.
3. In the configuration tree, expand **User Program** and click **Administrator**.

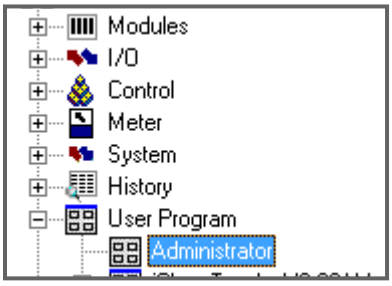


Figure 2.4 *User Program Administrator Path*

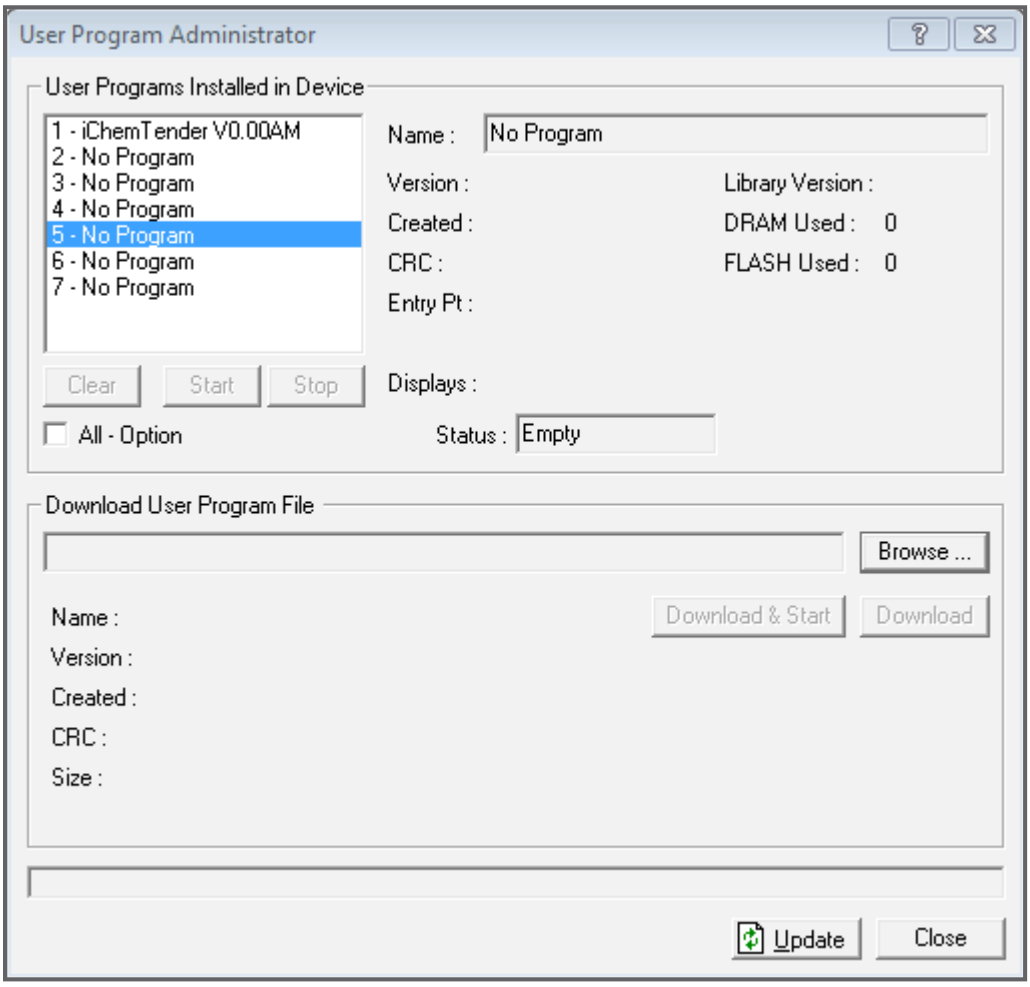


Figure 2.5 *User Program Administrator Dialog Box*

4. Click the **Browse...** button to locate and open the ROC 107 .bin file on your PC.
5. Ensure the **Download User Program File** path is correct, and then click **Download & Start**.

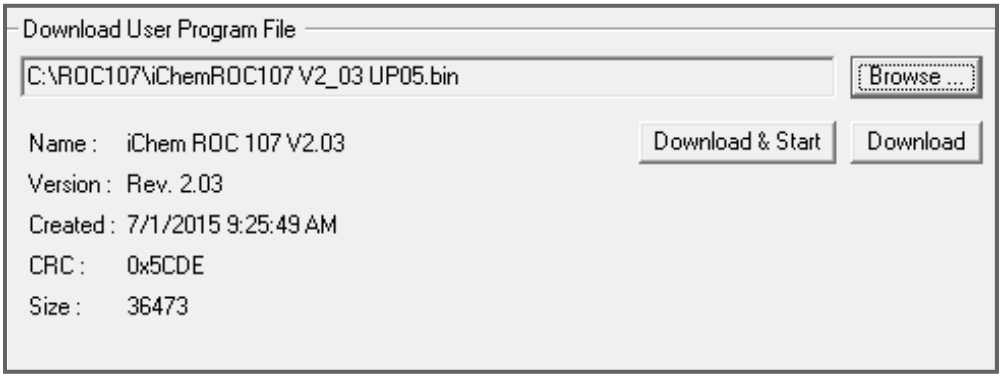


Figure 2.6 *Download User Program File*

6. Click **Download** to proceed.

   After downloading, iChem ROC 107 appears in the User Program slot with the application's properties displayed.

7. Click **Close** to download the application to the FloBoss 107 and automatically start running the program.

2.3 Licensing iChem ROC 107

To correctly license a user program slot, PCS Ferguson needs to know which slot will be running the application. You can have multiple iChem ROC 107 loads running simultaneously, but each user program MUST have a license for each slot.

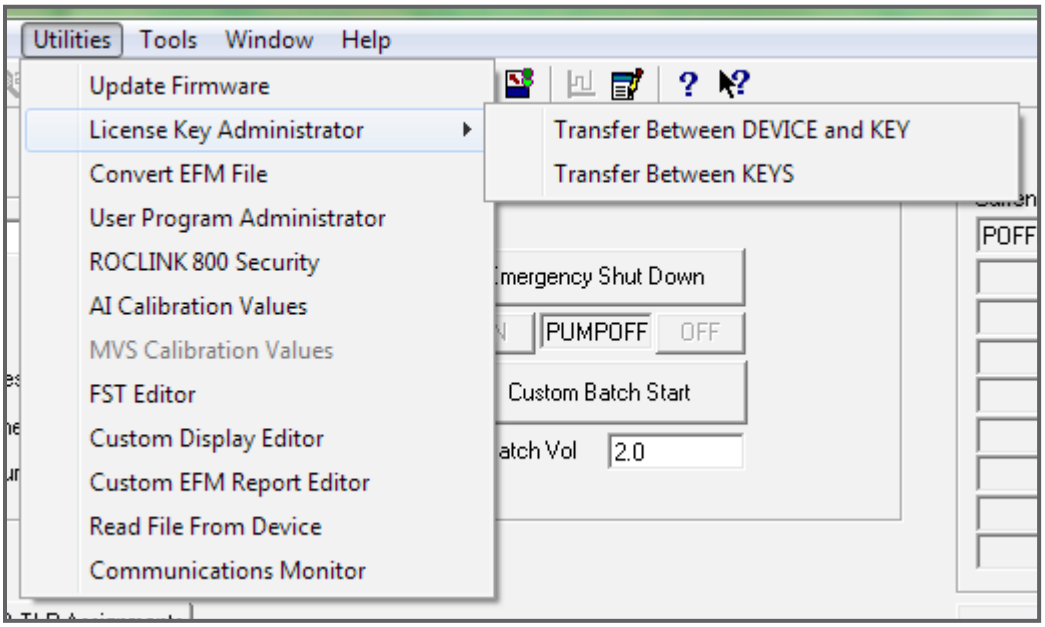


Figure 2.7 *Top Menu Licensing Options*

PCS Ferguson needs two items to license a particular iChem ROC 107 firmware:

- The FloBoss 107 serial number
- The User Program slot or slots being activated

In order to license the ROC 107 application, PCS Ferguson needs the serial number of the LCD controller. Ensure that you send the LCD controller serial number and not the CPU serial number.

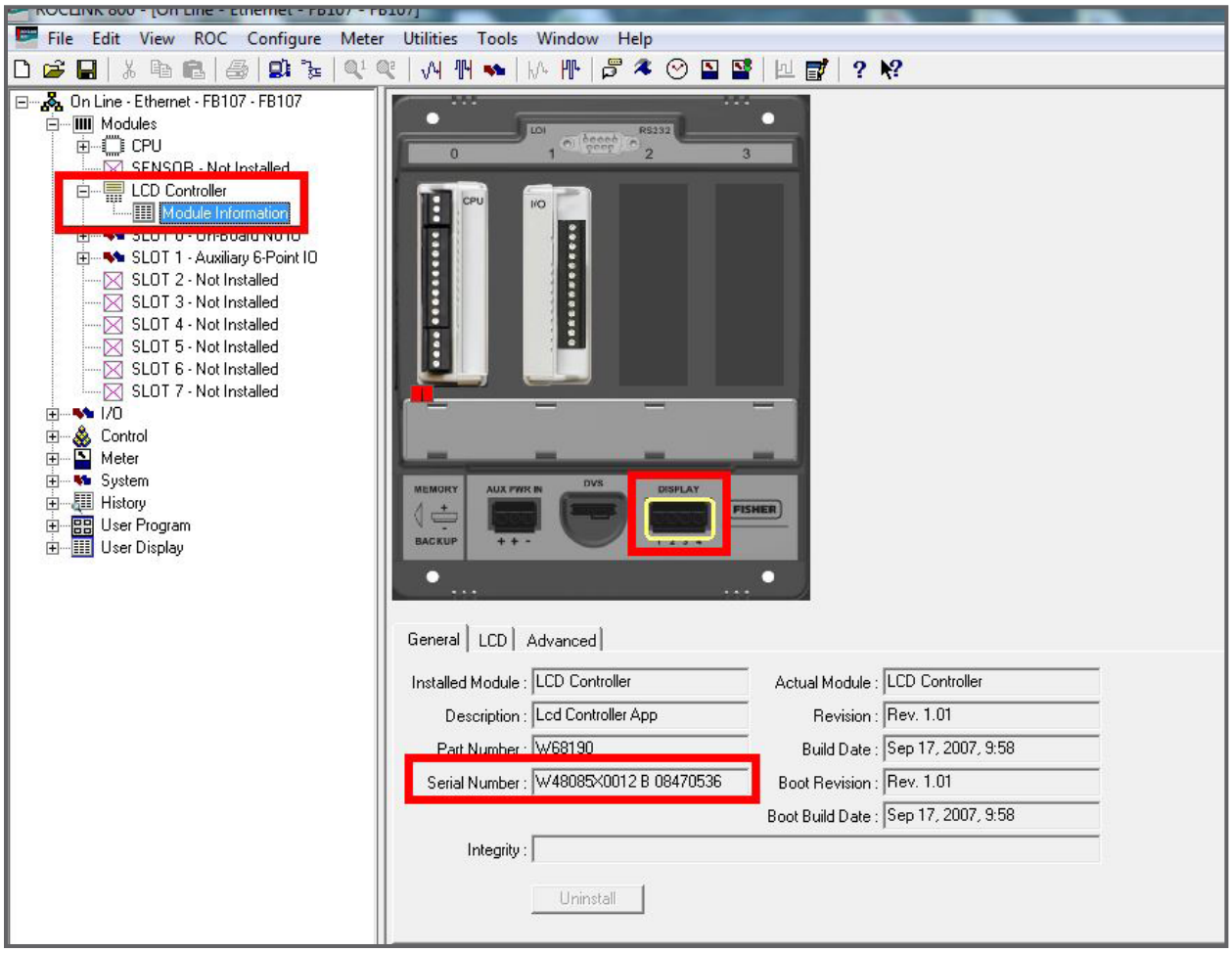


Figure 2.8 *LCD Controller Serial Number*

PCS Ferguson will send you a 105-character string through email.

1. Open ROCLINK 800 and click **Utilities>License Key Administrator>Transfer Between DEVICE and KEY.**
2. Click **Add License**.
3. Copy the 105-character string from your email, and paste it into the text box. Ensure you copy the entire string, including the exclamation mark (!) at the beginning.
4. Click **OK**.

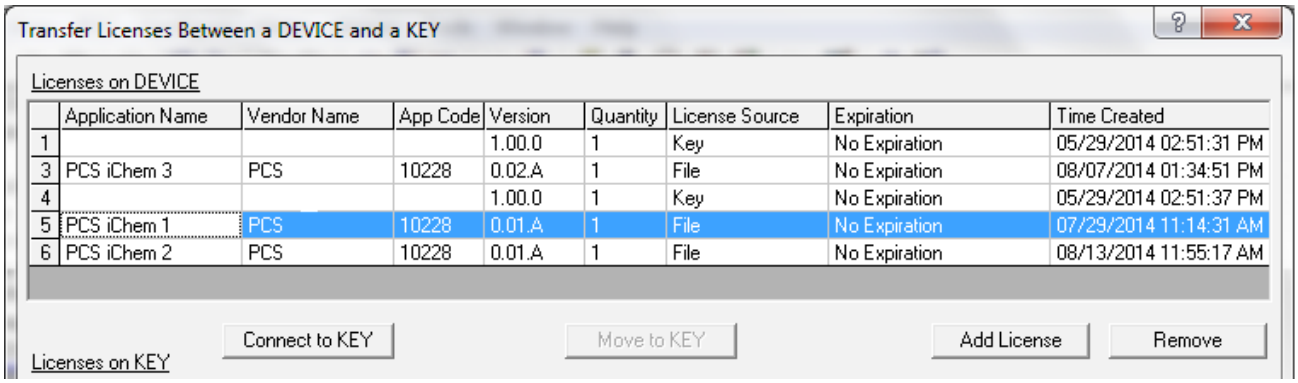

Transfer Licenses Between a DEVICE and a KEY
Licenses on DEVICE
Application Name | Vendor Name | App Code | Version | Quantity | License Source | Expiration | Time Created
1 | | | | 1.00.0 | 1 | Key | No Expiration | 05/29/2014 02:51:31 PM
3 | PCS iChem 3 | PCS | 10228 | 0.02.A | 1 | File | No Expiration | 08/07/2014 01:34:51 PM
4 | | | | 1.00.0 | 1 | Key | No Expiration | 05/29/2014 02:51:37 PM
5 | PCS iChem 1 | PCS | 10228 | 0.01.A | 1 | File | No Expiration | 07/29/2014 11:14:31 AM
6 | PCS iChem 2 | PCS | 10228 | 0.01.A | 1 | File | No Expiration | 08/13/2014 11:55:17 AM
Licenses on KEY
Connect to KEY
Move to KEY
Add License
Remove

Figure 2.9 *Licensing Screenshot*

Display

The separate display file is not necessary to use the application. The display is compiled into a single .bin file for iChem ROC 107 in the FloBoss 107 and is included with the program load. The display is under the User Program section of the tree.

2.4 Saving and Loading Configuration Settings

iChem ROC 107's settings are not saved automatically, and can be overwritten when updating your software version. Follow these procedures to save your settings before you update, and then reload the settings when the update is complete.

2.4.1 Saving TLP Points and Settings

1. Click **File>Save Configuration**.

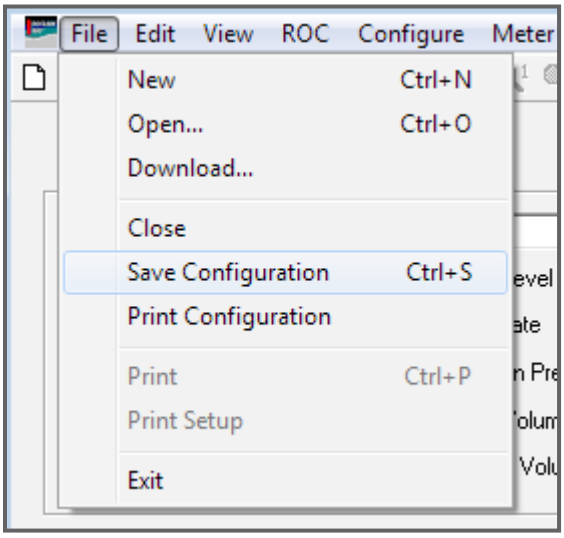


Figure 2.10 *Save Configuration Menu Path*

2. Type a name for the file and click **Save**.

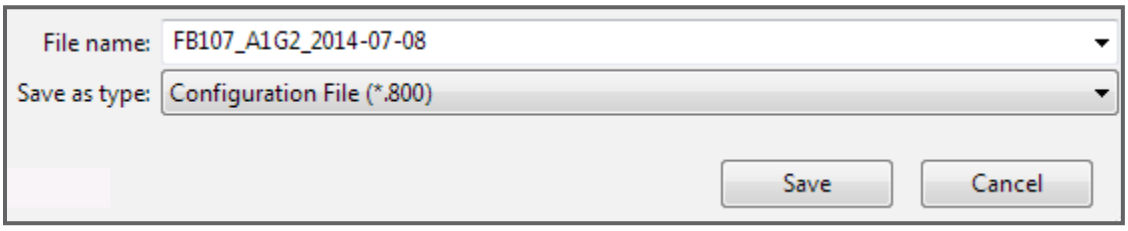


Figure 2.11 *Save File Dialog Box*

3. Click **Close**.

2.4.2 Loading Previously Saved Settings

1. Click **File>Download**.
2. Locate and **Open** your configuration file.

   The "Download Configuration" dialog box appears.

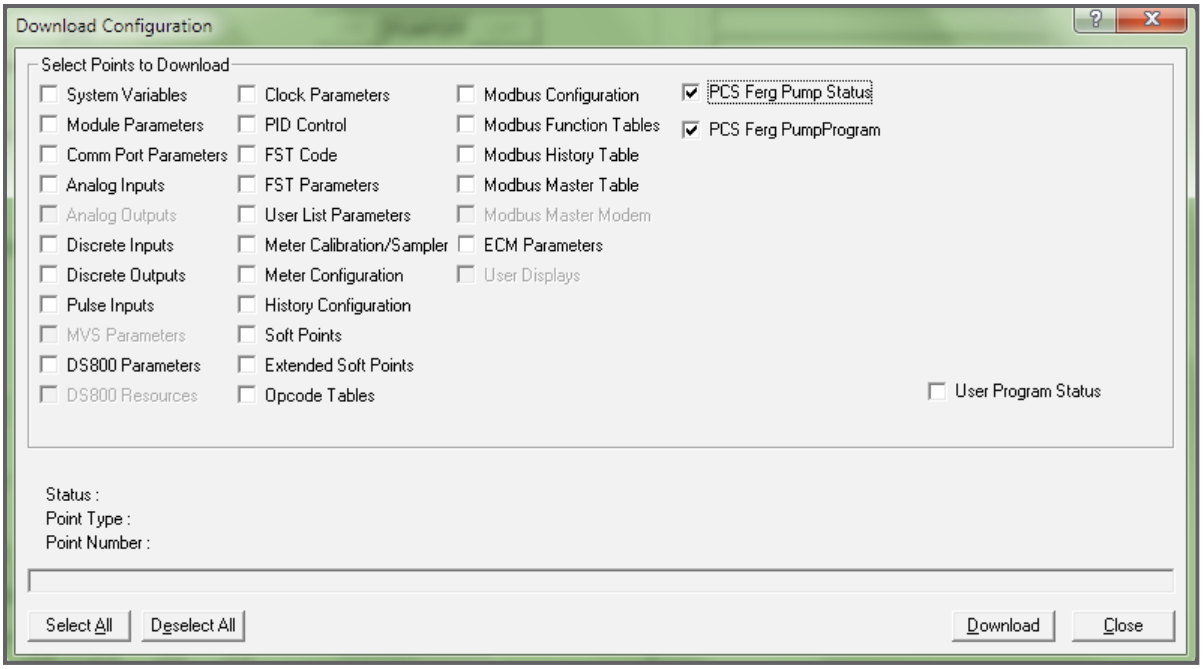


Figure 2.12 *iChem ROC 107 Download Configuration*

3. In the "Download Configuration" dialog box, select **PCS Ferg Pump Status** and **PCS Ferg Pump Program**. See Figure 2.12.

CAUTION You can overwrite gas flow measurement settings by clicking the wrong check boxes when loading settings. Use caution when selecting the check boxes.

4. Click **Download**.

   Your saved settings appear in your iChem ROC 107 user interface.

3 Setup and Calibration

This section details the process for mapping and calibrating inputs and outputs for your system.

NOTE *The same output slots can accommodate multiple output functions.*

3.1 Mapping I/O Points

Before running your pump system with iChem ROC 107, you must properly map the TLP points based on your system configuration. The user must define these TLP points.

For each TLP point:

1. Click the **[...]** button next to each TLP point to assign it to the corresponding slot based on your FloBoss setup.

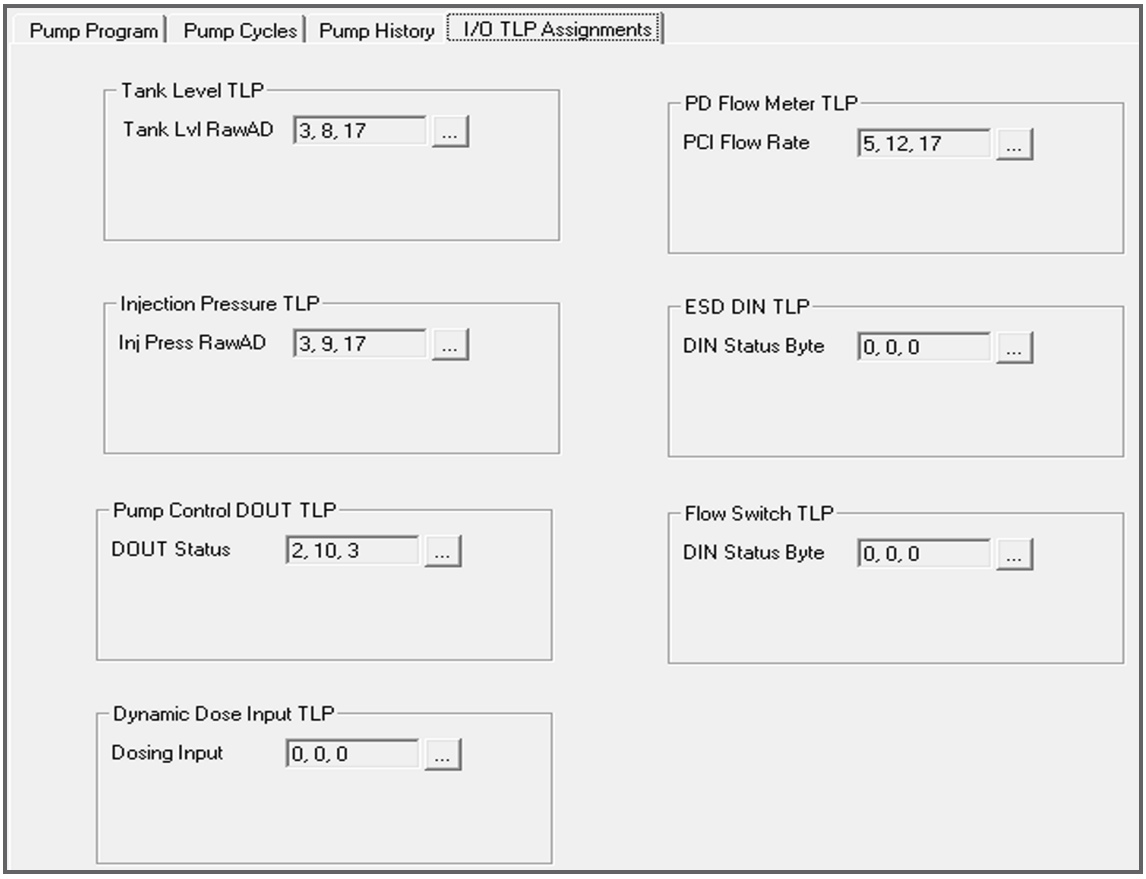


Figure 3.1 *I/O TLP Assignments Tab*

2. Select the correct I/O type in the **Point Type** scrolling list.
3. Select the corresponding **Logical Number** for the slot.
4. Select the correct **Parameter**.

3.1.1 Tank Level TLP

The Tank Level point uses analog input.

1. Select **Analog Inputs** in the **Point Type** scrolling list.
2. Select the corresponding **Logical Number** for the slot.
3. Select the correct **Parameter**.

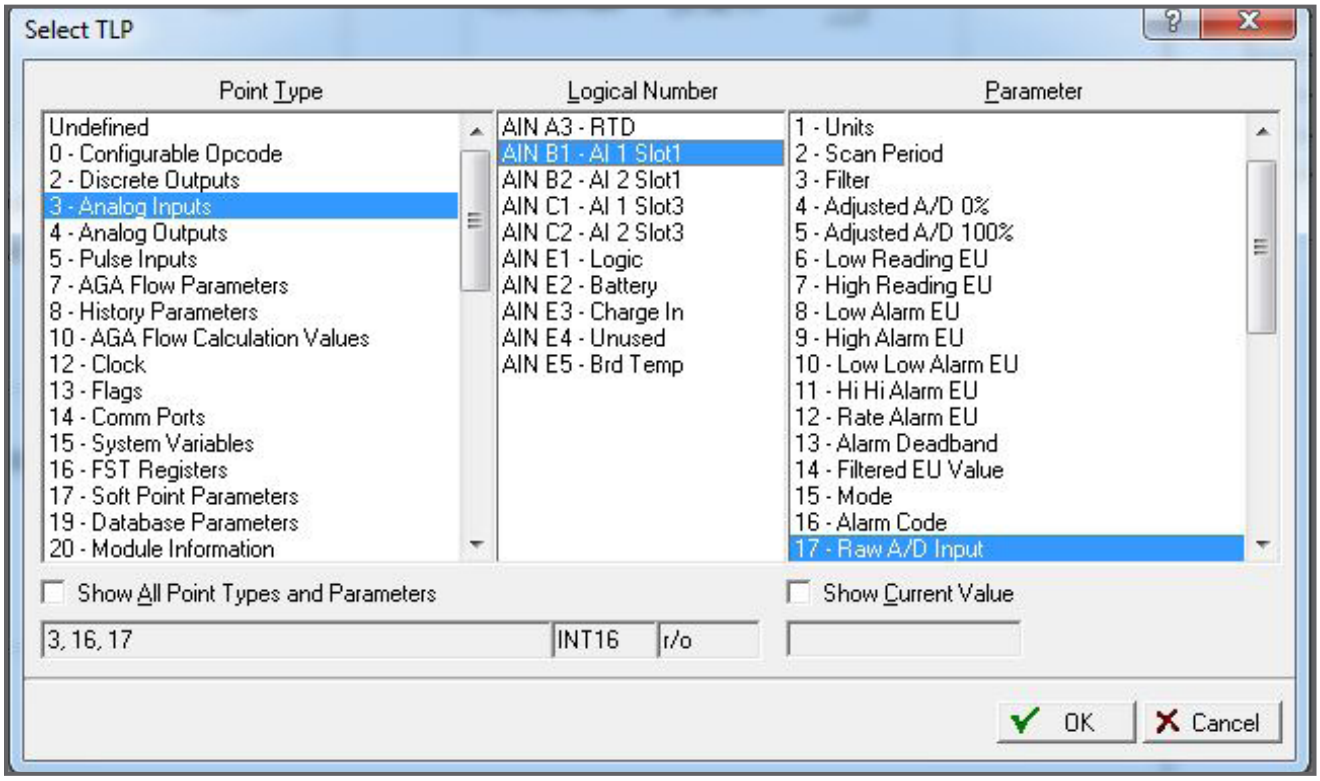

Select TLP
Point Type
Logical Number
Parameter
Undefined
0 - Configurable Opcode
2 - Discrete Outputs
3 - Analog Inputs
4 - Analog Outputs
5 - Pulse Inputs
7 - AGA Flow Parameters
8 - History Parameters
10 - AGA Flow Calculation Values
12 - Clock
13 - Flags
14 - Comm Ports
15 - System Variables
16 - FST Registers
17 - Soft Point Parameters
19 - Database Parameters
20 - Module Information
AIN A3 - RTD
AIN B1 - AI 1 Slot1
AIN B2 - AI 2 Slot1
AIN C1 - AI 1 Slot3
AIN C2 - AI 2 Slot3
AIN E1 - Logic
AIN E2 - Battery
AIN E3 - Charge In
AIN E4 - Unused
AIN E5 - Brd Temp
1 - Units
2 - Scan Period
3 - Filter
4 - Adjusted A/D 0%
5 - Adjusted A/D 100%
6 - Low Reading EU
7 - High Reading EU
8 - Low Alarm EU
9 - High Alarm EU
10 - Low Low Alarm EU
11 - Hi Hi Alarm EU
12 - Rate Alarm EU
13 - Alarm Deadband
14 - Filtered EU Value
15 - Mode
16 - Alarm Code
17 - Raw A/D Input
Show All Point Types and Parameters
Show Current Value
3, 16, 17
INT16
r/o
OK
Cancel

Figure 3.2 *Tank Level TLP Settings*

3.1.2 PD Flow Meter TLP

The PCI Flow Rate is always a pulse input.

Select the correct Point Type, Logical Number, and Parameter for each point based on your system configuration.

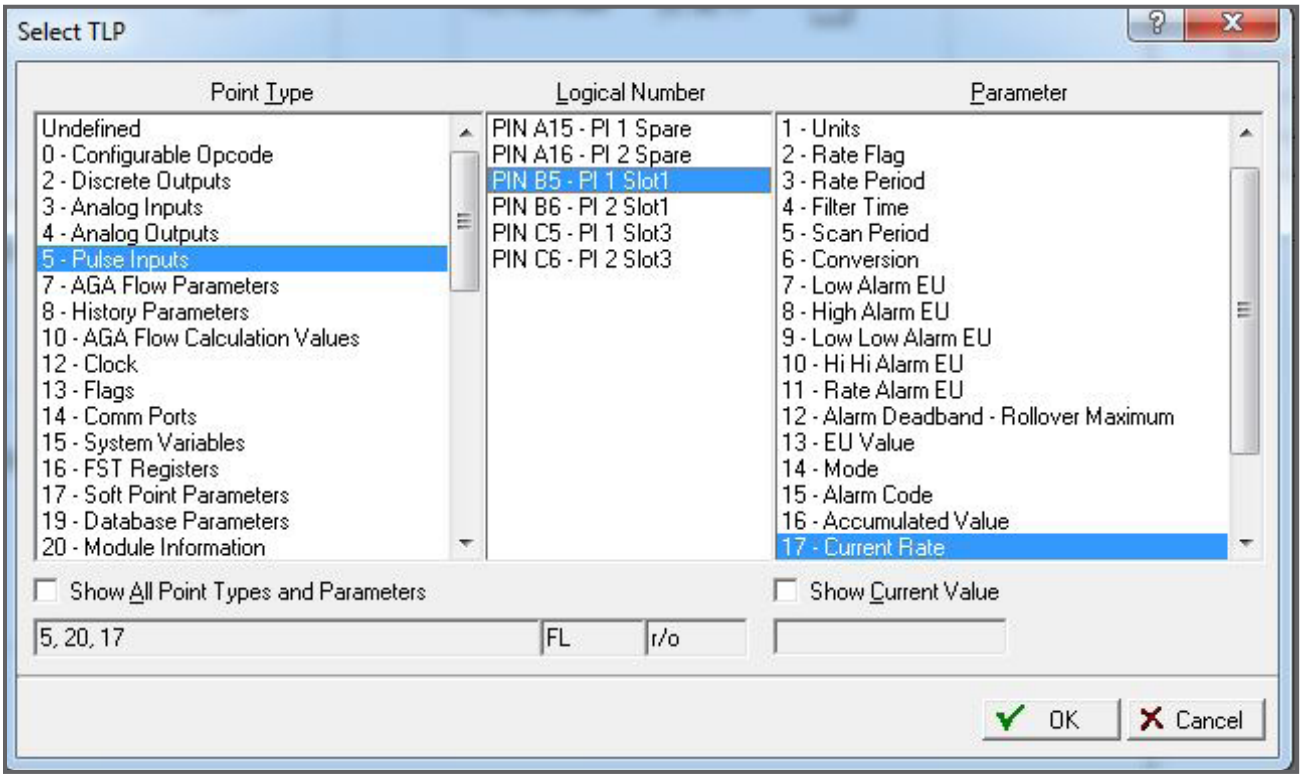


Figure 3.3 *PD Meter TLP Settings*

3.1.3 Injection Pressure TLP

Injection Pressure is an analog input.

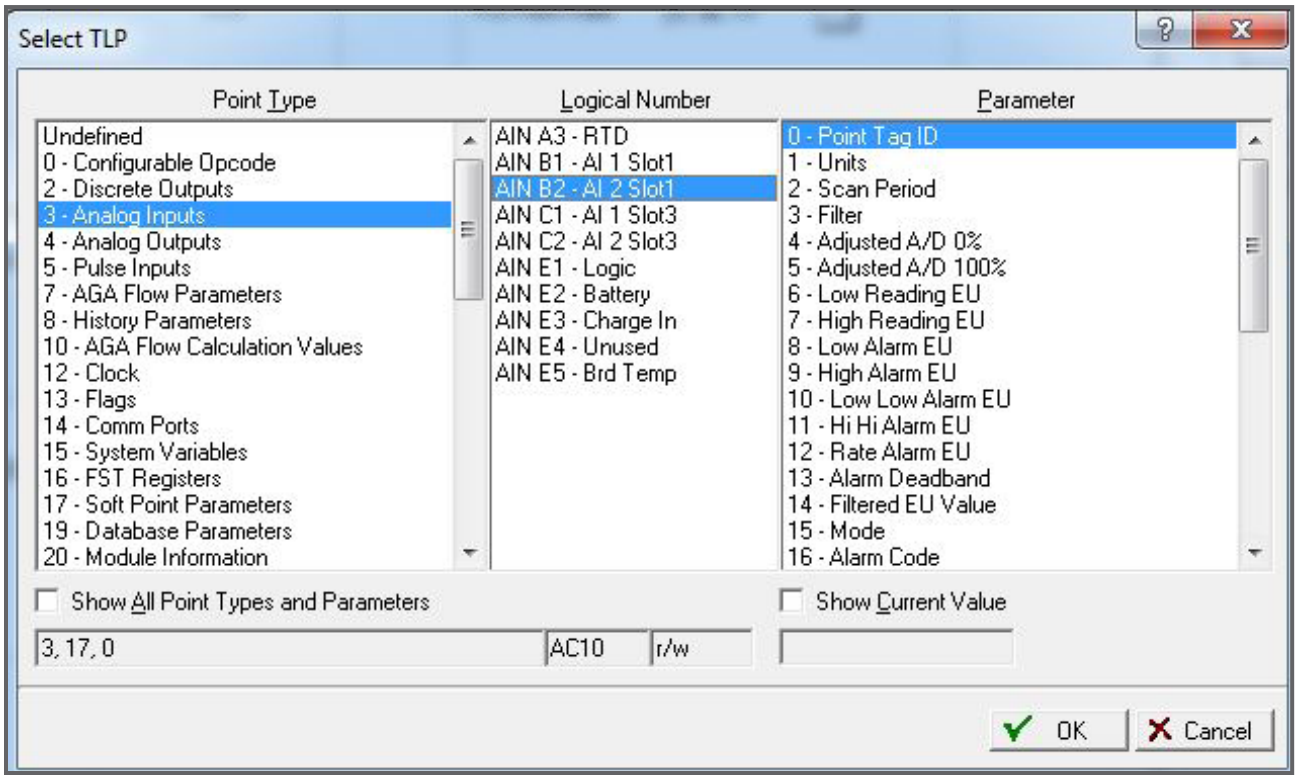

Select TLP
Point Type
Logical Number
Parameter
Undefined
0 - Configurable Opcode
2 - Discrete Outputs
3 - Analog Inputs
4 - Analog Outputs
5 - Pulse Inputs
7 - AGA Flow Parameters
8 - History Parameters
10 - AGA Flow Calculation Values
12 - Clock
13 - Flags
14 - Comm Ports
15 - System Variables
16 - FST Registers
17 - Soft Point Parameters
19 - Database Parameters
20 - Module Information
AIN A3 - RTD
AIN B1 - AI 1 Slot1
AIN B2 - AI 2 Slot1
AIN C1 - AI 1 Slot3
AIN C2 - AI 2 Slot3
AIN E1 - Logic
AIN E2 - Battery
AIN E3 - Charge In
AIN E4 - Unused
AIN E5 - Brd Temp
0 - Point Tag ID
1 - Units
2 - Scan Period
3 - Filter
4 - Adjusted A/D 0%
5 - Adjusted A/D 100%
6 - Low Reading EU
7 - High Reading EU
8 - Low Alarm EU
9 - High Alarm EU
10 - Low Low Alarm EU
11 - Hi Hi Alarm EU
12 - Rate Alarm EU
13 - Alarm Deadband
14 - Filtered EU Value
15 - Mode
16 - Alarm Code
Show All Point Types and Parameters
Show Current Value
3, 17, 0
AC10
r/w
OK
Cancel

Figure 3.4 *Inj Pressure TLP Settings*

3.1.4 Emergency Shutdown (ESD) DIN TLP

The ESD is a discrete input.

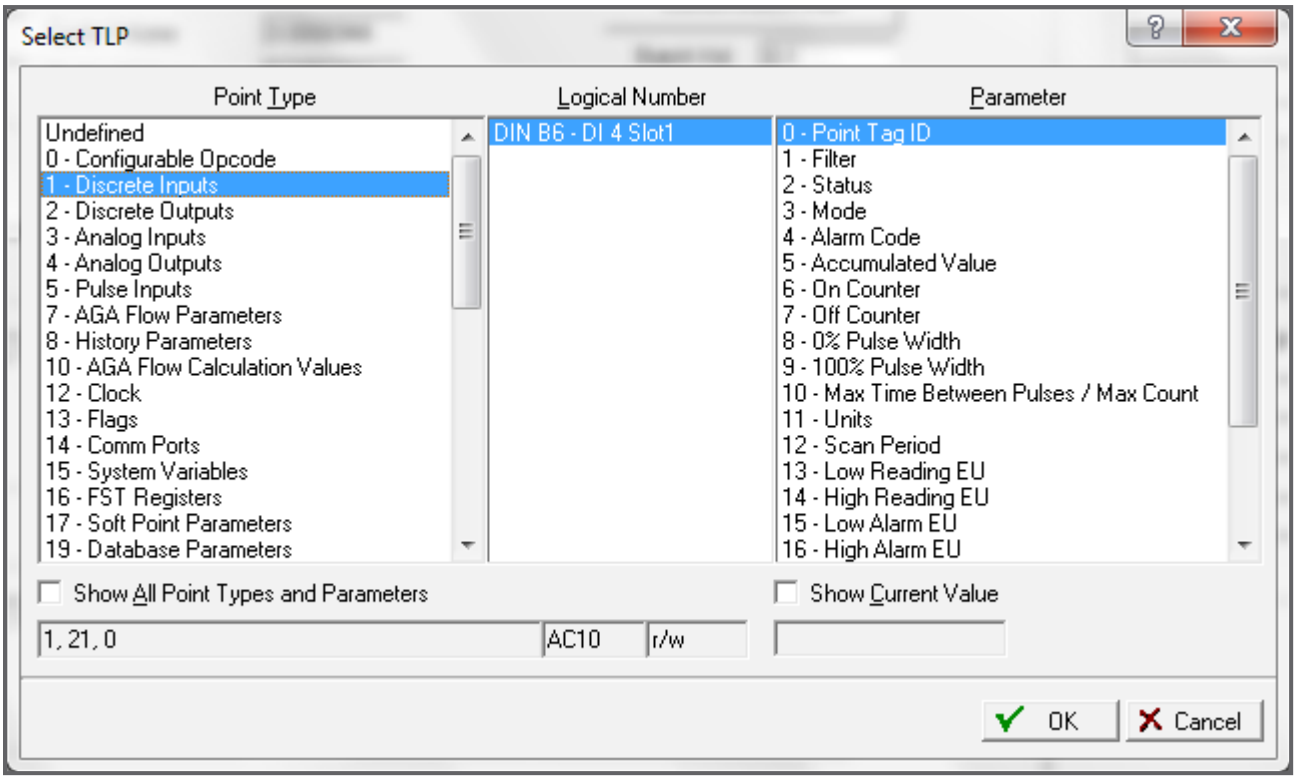


Figure 3.5 *ESD DIN TLP Settings*

3.1.5 Pump Control DOUT TLP

The Pump Control point is a digital output.

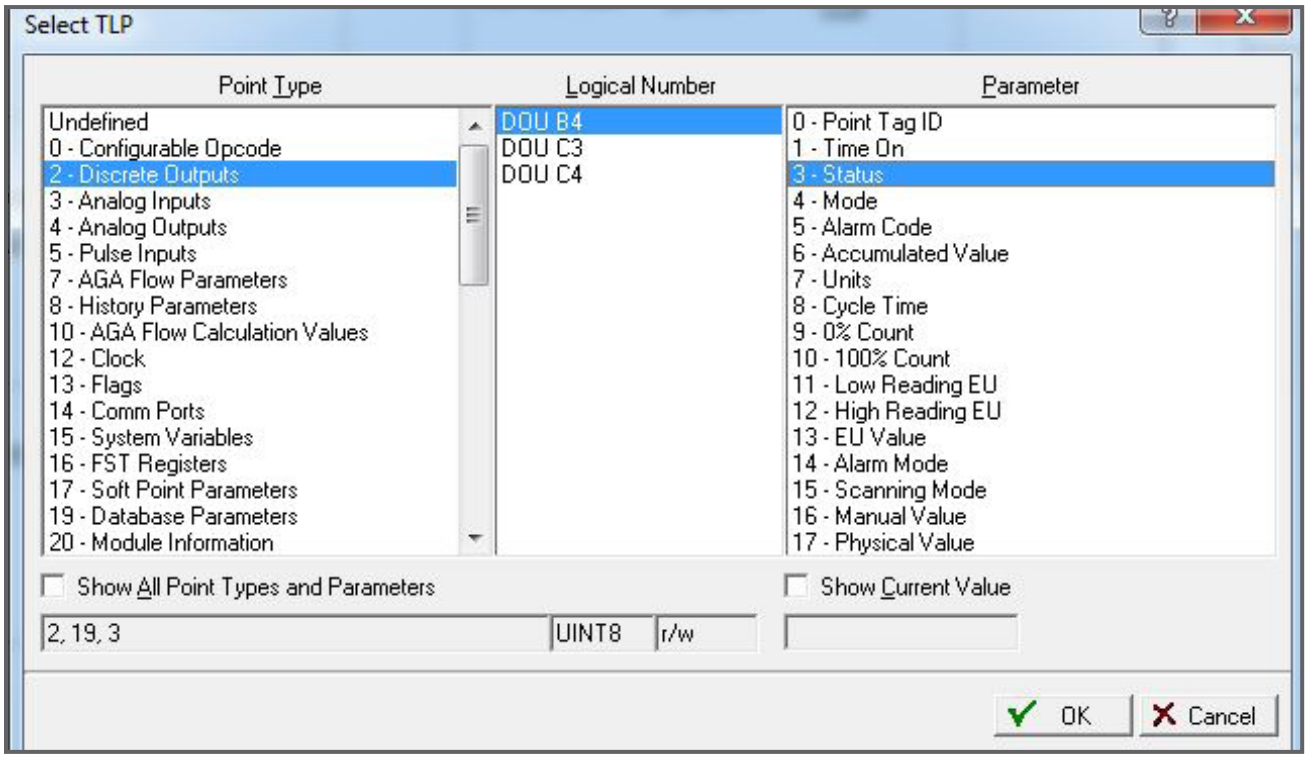


Figure 3.6 *Pump Control DOUT TLP Settings*

3.1.6 Flow Switch TLP

The Flow Switch point is a digital input.

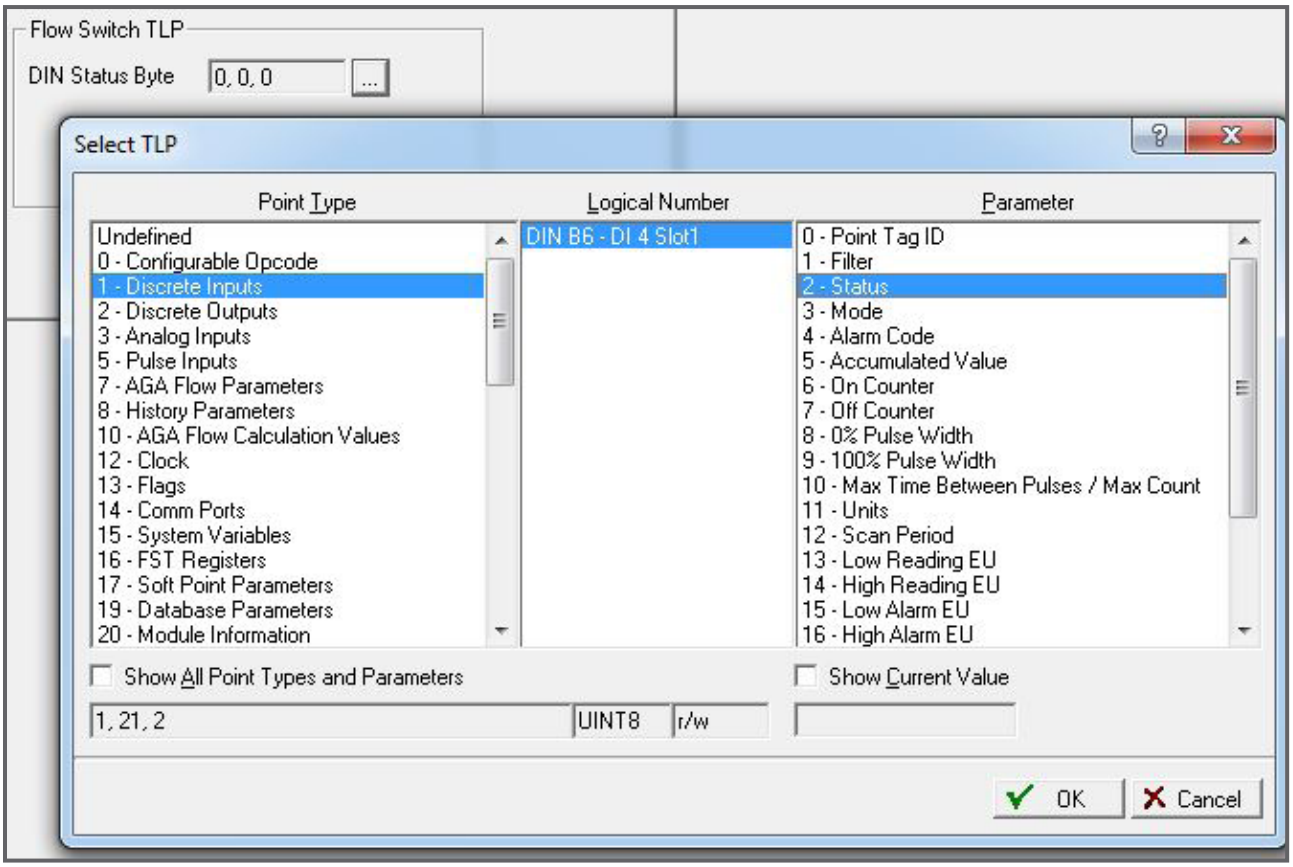


Figure 3.7 *Flow Switch TLP Settings*

3.1.7 Dynamic Dosing TLP

This is a User Defined input. The input must be a Float data-type. Examples: Analog measurement of transducer, temperature, H2S levels, ...

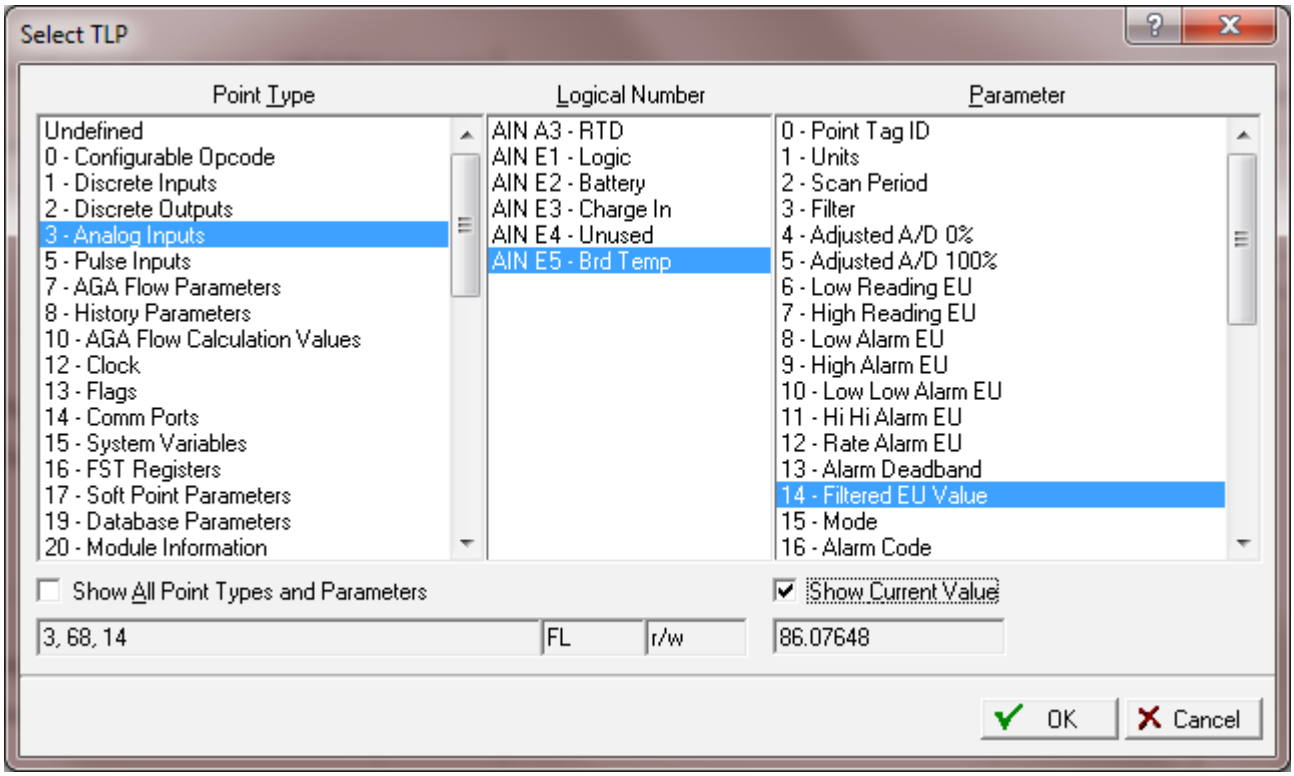


Figure 3.8 *Dynamic Dosing LTP Settings*

3.2 Calibrating the Flow Meter

The calibration controls are located on the Pump Program tab on the main iChem ROC 107 interface. NOTE: Click **Apply** in ROCLINK 800 when any field is changed.

3.2.1 Calibrating the PD Meter

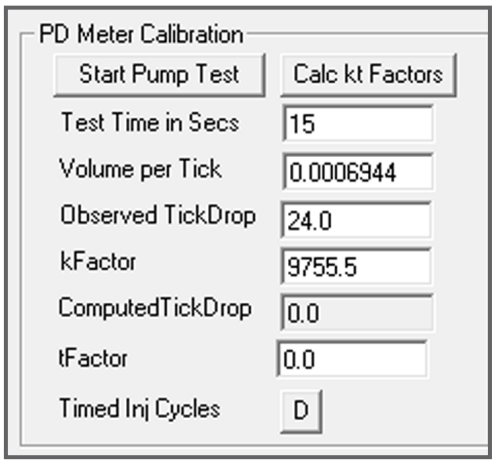


Figure 3.9 *PD Meter Calibration*

1. Isolate the pump tank from the sight glass.
2. Mark the top of the fluid point on your sight glass.
3. Click the **Start Pump Test** button to run the test.
4. Record the low point of the fluid after the test runs, and determine the difference.
5. Fill in the **Observed TickDrop** with the difference in fluid level before and after the test.
6. Click **Apply**.
7. Click the **Calculate kFactor** button.
8. Click **Update**.
9. Click **Enable/Disable** button to use tFactor as emergency backup of PD meter.

3.2.2 Calibrating the Tank Level

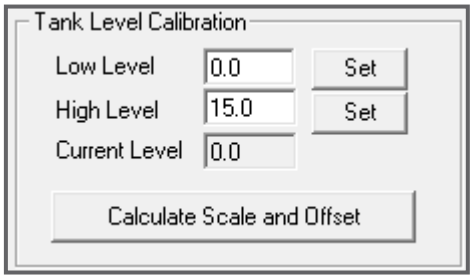


Figure 3.10 *Tank Level Calibration*

1. Set the High and Low Voltage Points.
   a. Isolate the tank.
   b. Draw down the sight glass.
   c. Enter the Low Level and click **Set**.
   d. Establish a level to the sight glass.
   e. Enter the High Level and click Set.
2. Click **Update**.
3. Calculate Scale and Offset.
4. Click **Update**.

The ROC 107 calculates the current Tank Level.

3.2.3 Calibrating the Injection Pressure

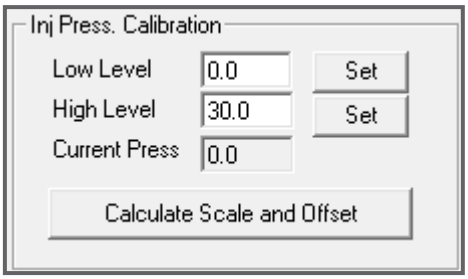


Figure 3.11 *Injection Pressure Calibration*

1. Set the High and Low Voltage Points.
   a. Isolate the transducer.
   b. Bleed gas into the atmosphere.
   c. Set the Low Level.
   d. Apply well pressure.
   e. Set the High Level.
2. Click **Update**.
3. Calculate Scale and Offset.
4. Click **Update**.

The ROC 107 calculates the current Injection Pressure.

3.3 Setting Up Cycles and Volume

Once all data points are mapped, the pump is ready for operation.

You can enter the necessary cycle and volume settings on the main ROC 107 screen, in the Pump Status panel and **Pump Program** and **Pump Cycles** tabs. NOTE: Click **Apply** in ROCLINK 800 when any field is changed.

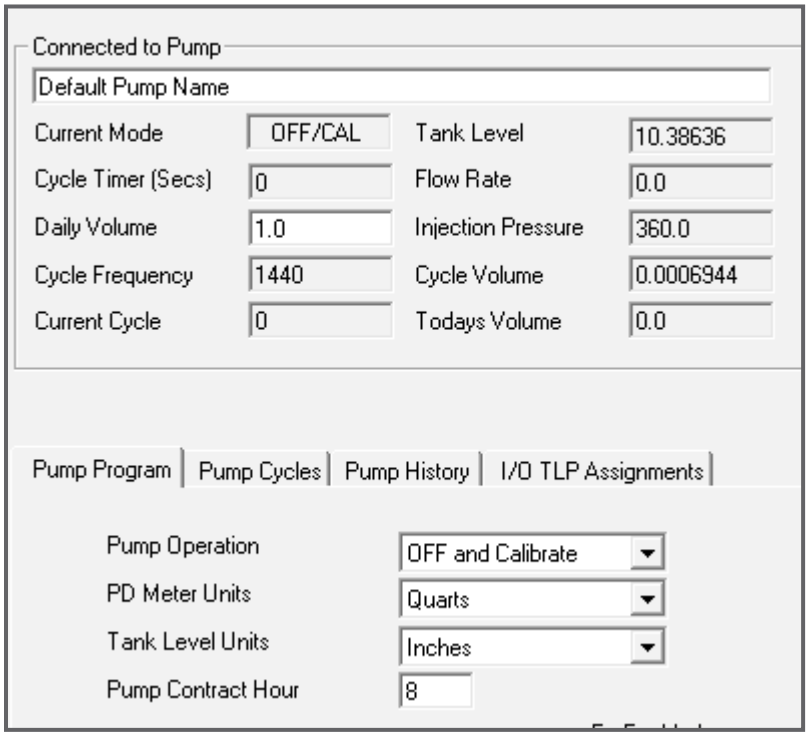


Figure 3.12 *Pump Status Panel and Tabs on the ROC 107 Interface*

3.3.1 Setting Daily Volume

In the Pump Status panel, enter the required injection volume per day in the **Daily Volume** field.

3.3.2 Setting Contract Hour

The **Pump Contract Hour** determines the time of day that the pump cycle starts. The clock uses a 24-hour format, with a default value of 8:00.

To change the default contract hour, type a new value in the **Pump Contract Hour** field on the **Pump Program** tab.

3.3.3 Setting Pump Cycle Interval

The **Cycle Frequency** field in the Pump Status panel automatically updates based on the selected **Cycle Interval** set on the **Pump Cycles tab**.

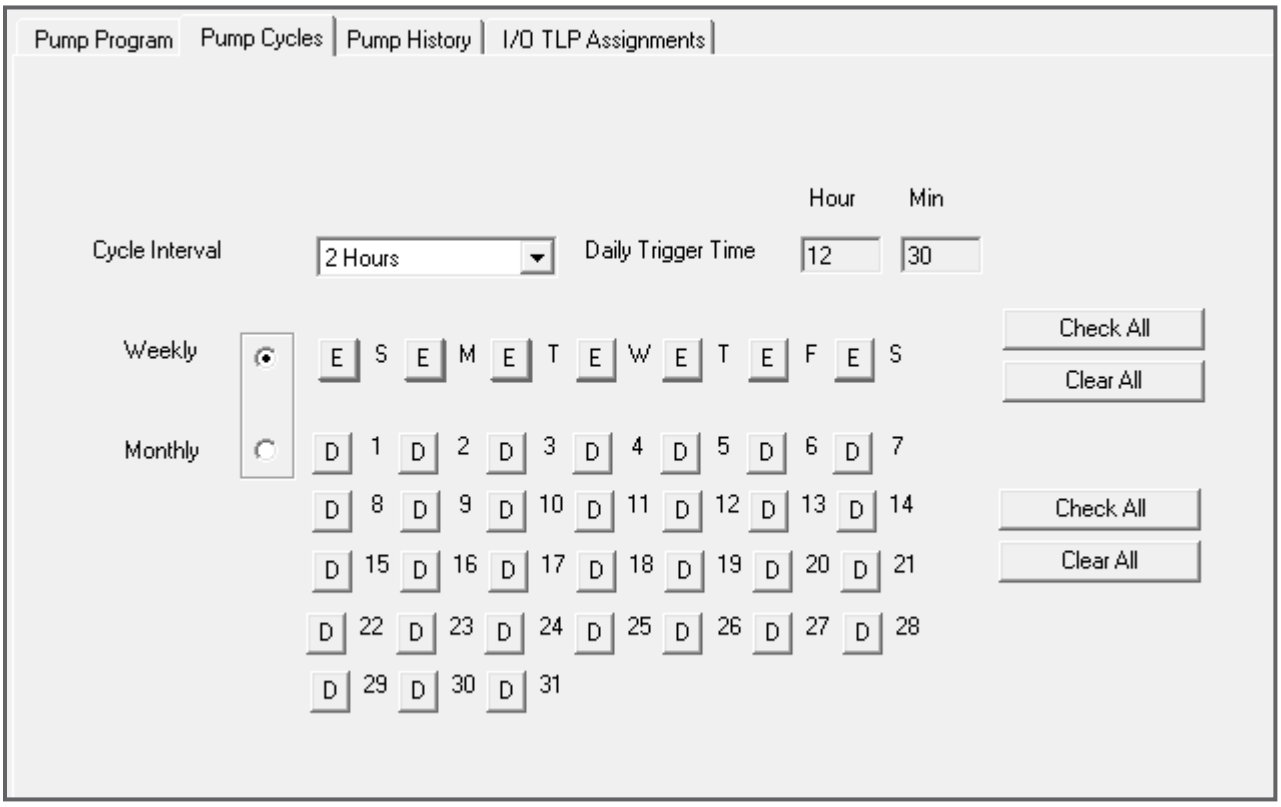

Pump Program
Pump Cycles
Pump History
I/O TLP Assignments
Hour
Min
Cycle Interval
2 Hours
Daily Trigger Time
12
30
Weekly
Monthly
E S E M E T E W E T E F E S
D 1 D 2 D 3 D 4 D 5 D 6 D 7
D 8 D 9 D 10 D 11 D 12 D 13 D 14
D 15 D 16 D 17 D 18 D 19 D 20 D 21
D 22 D 23 D 24 D 25 D 26 D 27 D 28
D 29 D 30 D 31
Check All
Clear All
Check All
Clear All

Figure 3.13 *Cycle Interval in the Pump Cycles Tab*

On the **Pump Cycles** tab, select the desired time between each pump cycle in the **Cycle Interval** drop-down list. Figure 3.12 shows a pump configured to run every two hours.

Set the cycle interval to **Daily** when you want the pump to run once at the **Daily Trigger Time** each day.

See Chapter “4 Controls and Features” for descriptions of each data field.

3.3.4 Dynamic Dosing

Dose Input Multiplier. This is a computation

Dose to be injected = Multiplier * TLP Input

Dose Minimum - A constraint of the minimum allowed Dose to be injected.

Dose Maximum - A constraint of the maximum allowed Dose to be injected.

Enable and Disable button of feature. Enabling overrides user defined injection volume.

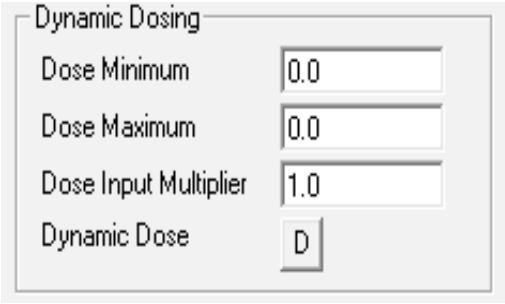


Figure 3.14 *Dynamic Dosing*

4 Controls and Features

This section details the functions of all data fields in the iChem ROC 107 interface.

4.1 Operation Modes

The iChem ROC 107 features three operation modes:
“AUTO,” “Manual,” and “OFF and Calibrate.”

The Operation Mode drop-down menu is located on the **Pump Program** tab.
NOTE: Click **Apply** in ROCLINK 800 when any field is changed.

Figure 4.1 *Pump Operation Drop-down Menu*

4.1.1 AUTO Mode

In Auto mode, the iChem ROC 107 manages the measured injection of well chemicals. The electronic flow meter detects the amount of fluid (to seven digits of precision) that is pumped into the well after each injection cycle. iChem ROC 107 then adjusts the next pump cycle amount to account for inaccuracies over or under the set volume per cycle. The flow meter causes the pump to skip cycles or simply revise the volume of the next cycle.

The PUMP ON and OFF buttons are not available in Auto mode. Any Alarms cause the pump to shut off, and switch the application to OFF/Calibrate mode. Warnings appear in the Warning box, but will disappear after an Update. The user can define the Warning and Alarm parameters in the **Pump Program** tab. All Warnings and Alarms are recorded in the event and history logs.

Custom batch injections can run in either Auto or Manual modes.

NOTE *If a scheduled cycle occurs in manual mode or during a batch run, the application skips that cycle.*

4.1.2 Manual Mode

Manual mode allows the user to turn the pump ON or OFF and to run custom batches.

NOTE *In Manual mode, the tank level will not update until eight (8) seconds after the pump stops.*

4.1.3 OFF and Calibrate Mode

In OFF/CAL mode, the only function available is calibration. The pump will not run. ROC 107 switches to this mode when the Emergency Shut Down (ESD) button is activated.

4.2 Pump Status Panel

This area of the iChem ROC 107 interface displays live measurements and pump cycle timing data, and contains the Emergency Shut Down and Batch functions.

4.2.1 Pump Status Fields and Functions

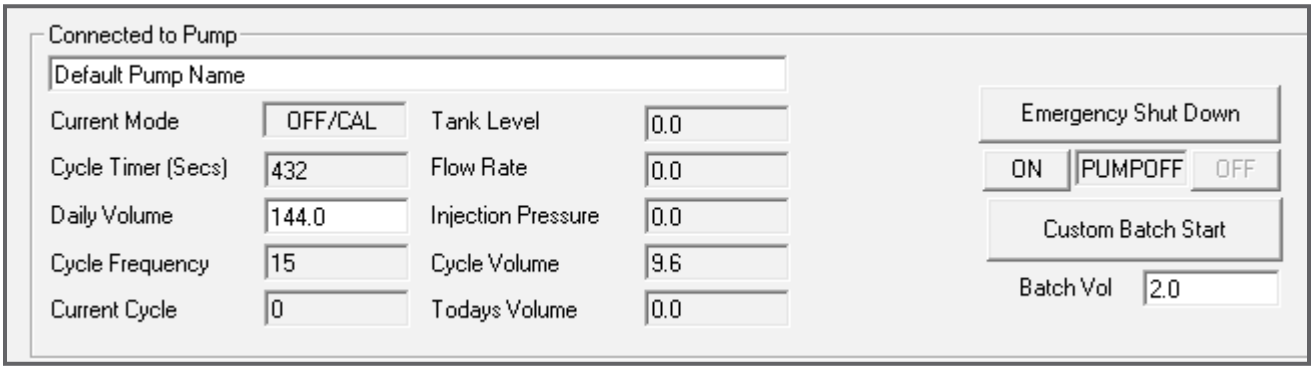


Figure 4.2 *Pump Status Panel*

Field	Function
Default Pump Name	Allows the user to type a name for the pump.
Current Mode	Shows which of the three operation modes (OFF/CAL, Auto, or Manual) is currently set on the Pump Program Tab.
Cycle Timer (Secs)	When the pump is OFF, this field counts down the time until the next cycle starts. When the pump is ON, this field counts the amount of time that the pump has been running. If the mode is switched from AUTO to another mode or Batch, the count resumes when the next cycle begins.
Daily Volume	Sets the total volume to be injected daily, and displays the volume.
Cycle Frequency	Displays the total number of pump cycles set to run on the current day. This value is based on the Cycle Interval set in the Pump Program tab.
Current Cycle	Displays the number of cycles that have occurred that day. This count resets at the Contract Hour time defined in the Pump Program tab.
Tank Level	Displays the Tank Level reading from the pressure transducer. This entry requires calibration in the Pump Program tab and TLP definition in the I/O TLP Assignments tab.
Flow Rate	Displays the PD Meter reading. This entry requires calibration in the Pump Program tab and TLP definition in the I/O TLP Assignments tab.
Injection Pressure	Displays the Injection Pressure reading from the Pressure Transducer. This entry requires calibration in the Pump Program tab and TLP definition in the I/O TLP Assignments tab.

Field	Function
Cycle Volume	Displays the volume to be injected in the next cycle. In AUTO and Batch modes, this field counts down while pumping. In Manual mode, it counts up while pumping.
Todays Volume	Displays the volume as measured by the PD meter for the current day, starting at the Contract Hour time defined in the Pump Program tab.

4.2.2 Emergency Shut Down Button

Field	Function
Emergency Shut Down Button	Turns off the pump and switches the application to the OFF/CAL operation mode.

4.2.3 ON/OFF Buttons

Field	Function
ON Button	Turns ON Pump in MANUAL mode. This button is disabled in other modes.
Pump State	PUMPON or PUMPOFF shows the current state of the pump.
OFF Button	Turns off pump in MANUAL or BATCH mode. Disabled in other modes.

NOTE *To turn off the pump in AUTO mode, you must switch to MANUAL or OFF/CAL.*

4.2.4 Custom Batch Fields

Field	Function
Custom Batch Start	Starts a custom Batch in AUTO or MANUAL mode.
Batch Vol.	Sets the volume for an instantaneous batch injection.
Correction Batch Start	Starts a custom Batch in AUTO or MANUAL mode.
Batch Vol.	CPU computed volume for an instantaneous batch injection.

NOTE *If a scheduled cycle occurs during batch mode, the cycle is skipped. If Correction Batch is Enabled in Pump Program Tab, if unit stops injection due to alarm or user placing in OFF/Cal mode. CPU will compute volume during missed cycles due to stop condition.*

4.3 Alarms Panel

This area of the iChem ROC 107 interface displays active Warnings and Alarms.

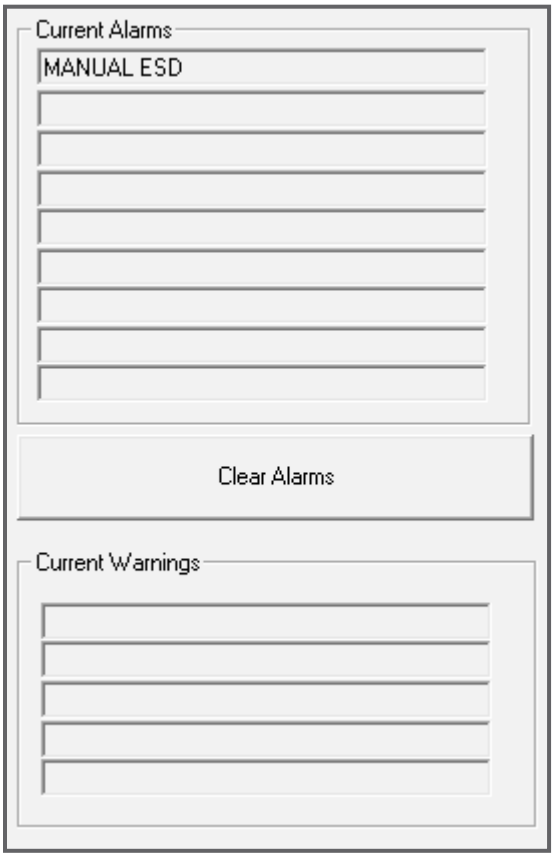


Figure 4.3 *Alarms Panel*

4.3.1 Alarm Messages and Meanings

These alarms trigger Emergency Shut Down.

Message	Abbreviation	Meaning
Low Tank	LO TNK ESD	The fluid level in the tank is low.
Low Flow	LO FLO ESD	The flow volume is low.
High Flow	HI FLO ESD	The flow volume is high.
Low Press	LO PRES ESD	The flow pressure through the transducer is low.
High Press	HI PRES ESD	The flow pressure through the transducer is high.
No Flow	NO FLO ESD	There is no fluid flow.
Flow Switch	FLO SWEC ESD	The flow switch has been triggered.
User Defined Low	USER LO ESD	The associated user defined measurement is at the low threshold.
User Defined High	USER HI ESD	The associated user defined measurement is at the high threshold.
Manual ESD	MANUAL ESD	The user has clicked the **Emergency Shut Down** button.

4.4 Pump Program Tab

The Pump Program tab contains essential settings for operating and calibrating the system.

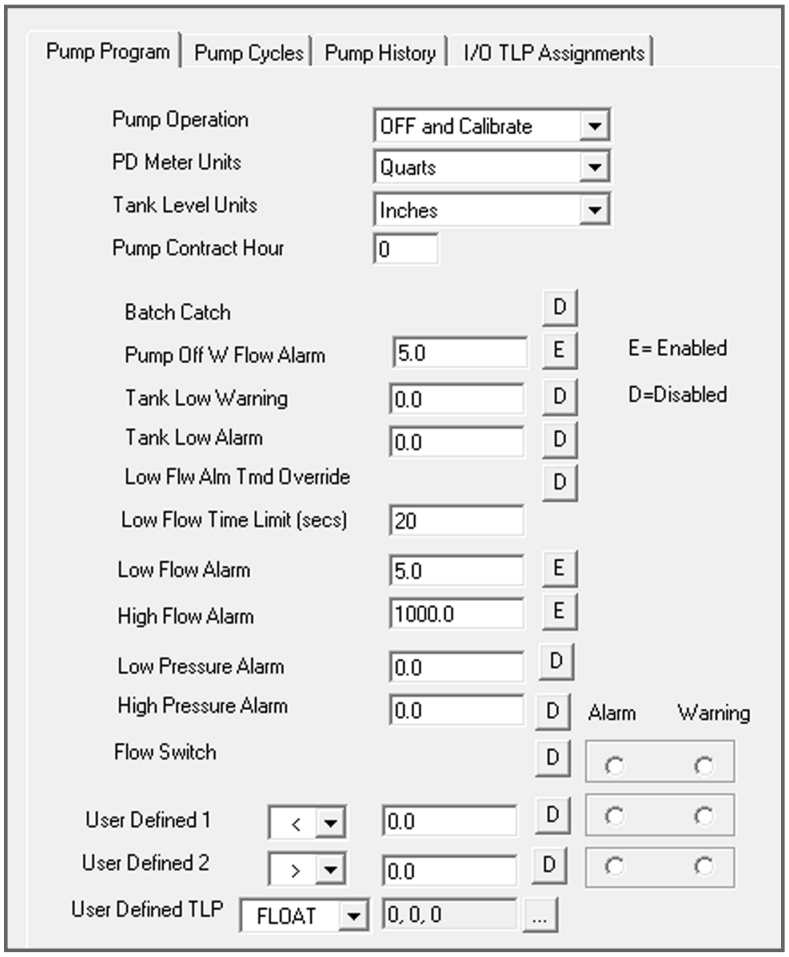


Figure 4.4 *Pump Program Tab*

Field	Function
Pump Operation	Defines the current mode of operation. Select from AUTO, Manual, or OFF and Calibrate.
PD Meter Units	Defines the units the ROC 107 uses to measure the flow. Select from Quarts, US Gallons, or Liters.
Tank Level Units	Defines the units the ROC 107 uses to measure the tank level. Select from Inches or Centimeters.
Pump Contract Hour	Defines the hour of the day when the pump restarts the Daily Volume measurement. At the set hour, Todays Volume clears to zero for the beginning of the new day. This setting uses a 24-hour clock.
Batch Catch D/E	Enable and Disable Correction Batch feature.
Pump Off W Flow Alarm	Defines the flow rate af which the alarm will activate eight seconds after the pump is off.
Tank Low Warning	Defines the level at which the tank low warning activates.
Tank Low Alarm	Defines the level at which the tank low alarm activates and shuts off the pump.
Low Flow Alarm	Defines the level at which the low flow alarm activates and shuts off the pump. This function checks the flow pressure every 20 seconds after the pump starts and continuously while pumping.

Field	Function
High Flow Alarm	Defines the level at which the high low alarm activates and shuts off the pump.
Low Pressure Alarm	Defines the level at which the low pressure alarm activates and shuts off the pump.
High Pressure Alarm	Defines the level at which the high pressure alarm activates and shuts off the pump.
Flow Switch	Optional flow switch that confirms flow. The switch uses digital input for ON or OFF.
User Defined 1	Defines a data point, based on the User Defined TLP setup. The user can enable the point for an Alarm or Warning flag.
User Defined 2	Defines a data point, based on the User Defined TLP setup. The user can enable the point for an Alarm or Warning flag.
User Defined TLP	Defines a TLP for dynamic definitions of alarms or warnings.
Enable/Disable Buttons	Allows the user to enable or disable any alarm or warning. E=enabled, D=Disabled
Alarm/Warning Buttons	Lets the user set the Flow Switch and User Defined points as Alarms or Warnings.

4.4.1 PD Meter Calibration

Field	Function
Test Time in Secs	Defines the amount of time the pump runs during a positive displacement (PD) meter calibration test.
Volume per Tick	Lets the user set the volume per tick used in pump calibration.
Observed Tick Drop	During pump calibration, the user enters how many ticks the fluid dropped in this field.
kFactor	Displays the computed kFactor after Calculate kFactor is clicked.
Computed Tick Drop	Displays the computed fluid drop, which should match the Observed Tick Drop. This measurement is based off Test Time, Volume per Tick and the kFactor. Changing the Test Time in Secs and starting a pump test will compute a tick drop based on the calibrated factor.
Start Pump Test Button	Starts the pump test. Test Time and Volume per Tick must be entered before pressing this button. The pump runs for time defined by the Test Time field.
Calculate kFactor Button	Measures PD meter pulses during the pump test and calculates the kFactor for the injection system. You must run the pump test before clicking this button to calculate. When clicked, this button computes the slope and offset of the calibration.

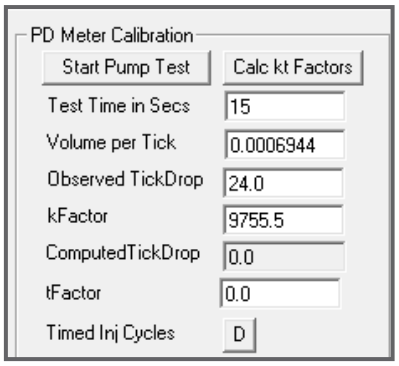


Figure 4.5 *PD Meter Calibration Panel*

Field	Function
tFactor Button	When Enabled, after each successful cycle of PD meter, a current tFactor is computed. if PD meter fails to show flow, unit after time will jump into tFactor mode. If PD meter operates again, will switch back to PD measurement mode.

4.4.2 Tank Level Calibration

Field	Function
Low Level	Enables the user to set the low level entry for tank calibration. Click the Set button when the fluid is at the low level in tank.
High Level	Enables the user to set the high level entry for tank calibration. Click the Set button when the fluid is at the high level in tank.
Current Level	Displays the current fluide level in the tank as measured eight (8) seconds after the pump stops.
Calculate Scale and Offset Button	Calculates the linear curve the transducer will follow for a specific voltage based on the high and low levels.

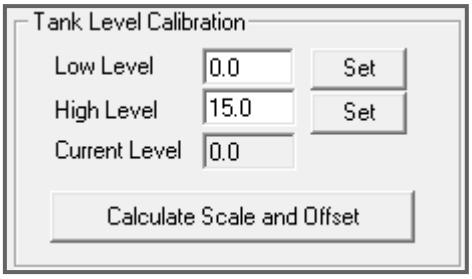


Figure 4.6 *Tank Level Calibration*

4.4.3 INJ Pressure Calibration

Field	Function
Low Level	Enables the user to set the low level entry during pressure transducer calibration for injection pressure.
High Level	Enables the user to set the high level entry during pressure transducer calibration for injection pressure.
Current Press	Displays the current injection pressure.
Calculate Scale and Offset Button	Calculates the linear curve the transducer will follow for a specific voltage based on the high and low levels.

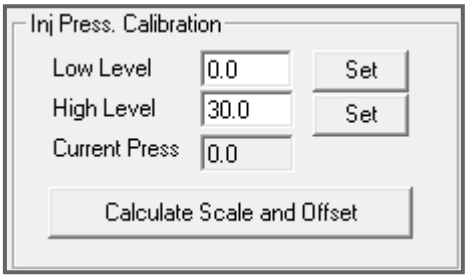


Figure 4.7 *Injection Pressure Calibration*

4.5 Pump Cycles Tab

This tab enables the user to set the timing for pump cycles at a weekly, monthly, and daily level.

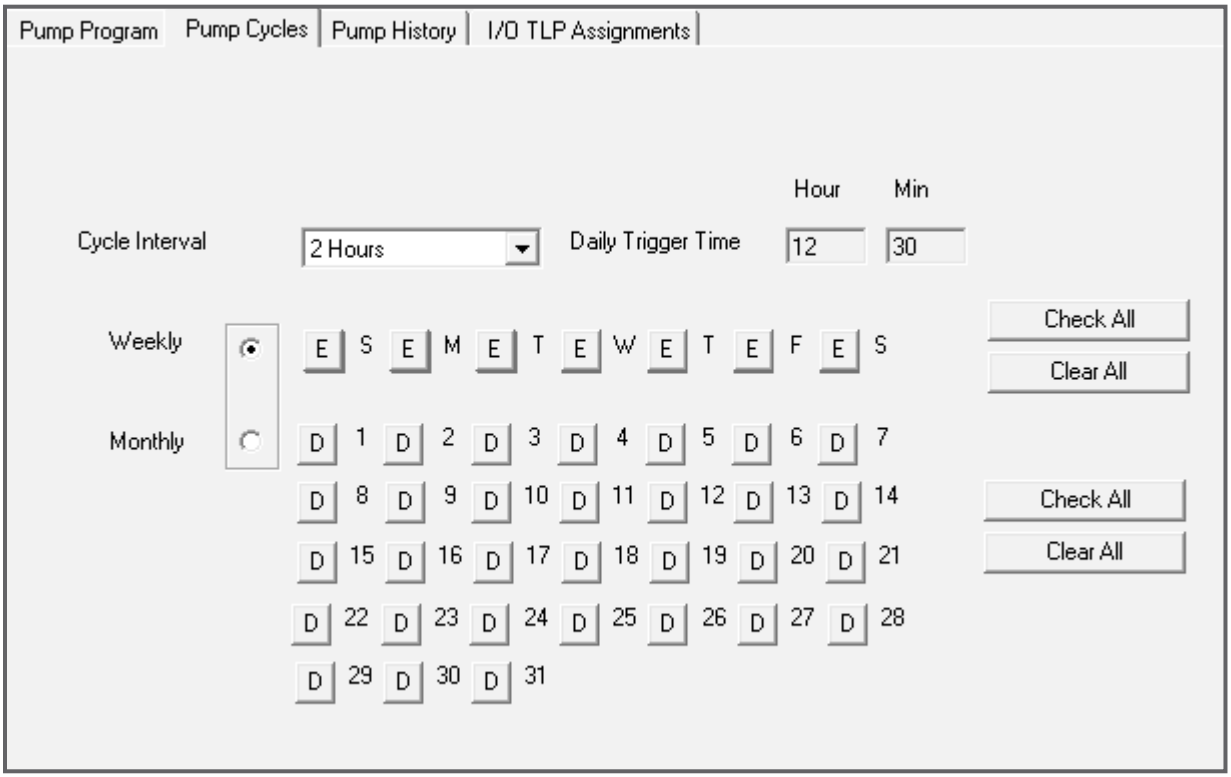

Pump Program
Pump Cycles
Pump History
I/O TLP Assignments
Hour
Min
Cycle Interval
2 Hours
Daily Trigger Time
12
30
Weekly
Monthly
Check All
Clear All
Check All
Clear All
E S E M E T E W E T E F E S
D 1 D 2 D 3 D 4 D 5 D 6 D 7
D 8 D 9 D 10 D 11 D 12 D 13 D 14
D 15 D 16 D 17 D 18 D 19 D 20 D 21
D 22 D 23 D 24 D 25 D 26 D 27 D 28
D 29 D 30 D 31

Figure 4.8 *Pump Cycles Tab*

Field	Function
Cycle Interval	Defines the amount of time between the start of pump cycles, in minutes, hours, or daily.
Daily Trigger Time	Defines the time the pump starts if the Cycle Interval is once Daily.
Weekly	Alows the user to select specific days of week to pump. For every day, click Check All.
Monthly	Allows the user to select specific days of the month to pump. During months shorther than 31 days, the application skips the extra days. For every day, click Check All.
D	Indicates Disabled.
E	Indicates Enabled.

4.6 Pump History Tab

This tab displays statistics for chemical injection over time.

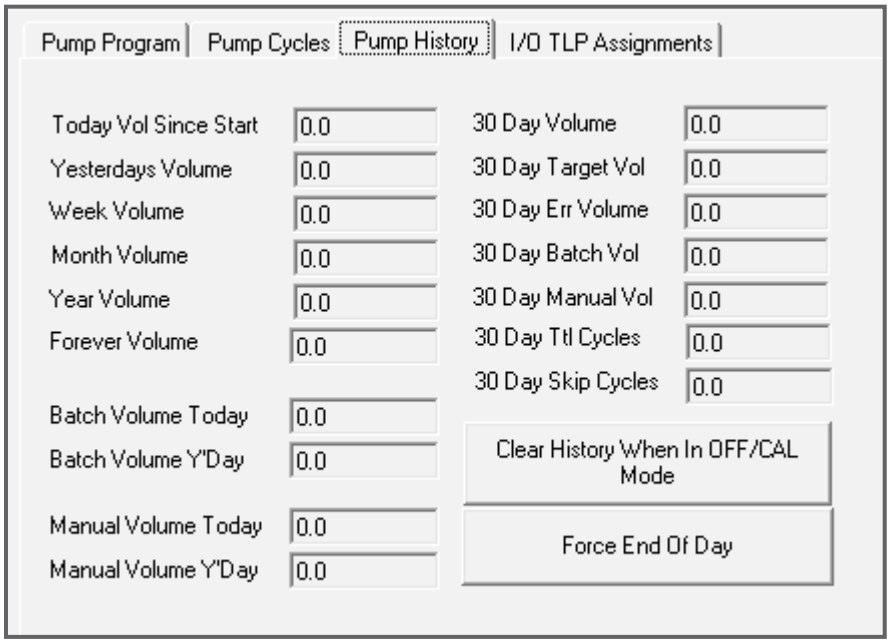


Figure 4.9 *Pump History Tab*

Field	Function
Today Vol Since Start	Volume injected since the contract hour.
Yesterdays Volume	Volume recorded in the previous 24-hours, from contract hour to contract hour.
Week Volume	Volume injected in a week period. This field resets on Sunday.
Month Volume	Volume injected in a month. This field resets on the 1st of each month.
Year Volume	Volume injected in a Year. This field resets on January 1st.
Forever Volume	Volume injected since the application began tracking pump allocation.
Batch Volume Today	Additional volume injected using custom batches.
Batch Volume Y'Day	Volume of custom batches added in the previous 24 hours, contract hour to contract hour.
Manual Volume Today	Additional volume added manually.
Manual Volume Y'Day	Manual volume added in the previous 24 hours, contract hour to contract hour.
30 Day Volume	Volume injected in the previous 30 days.
30 Day Target Vol	Target volume for previous 30 days.
30 Day Err Volume	Difference between the 30 Day Target Vol and 30 Day Volume.
30 Day Batch Vol	Volume injected as a custom batch in the last 30 days.
30 Day Manual Vol	Volume manually added in the last 30 days.
30 Day Ttl Cycles	Number of pump cycles that have occurred in the last 30 days.
30 Day Skip Cycles	Number of pump cycles skipped in the last 30 days.

4.7 I/O TLP Assignments Tab

The user must map the TLP points on this tab prior to operation. See “3.1 Mapping I/O Points”

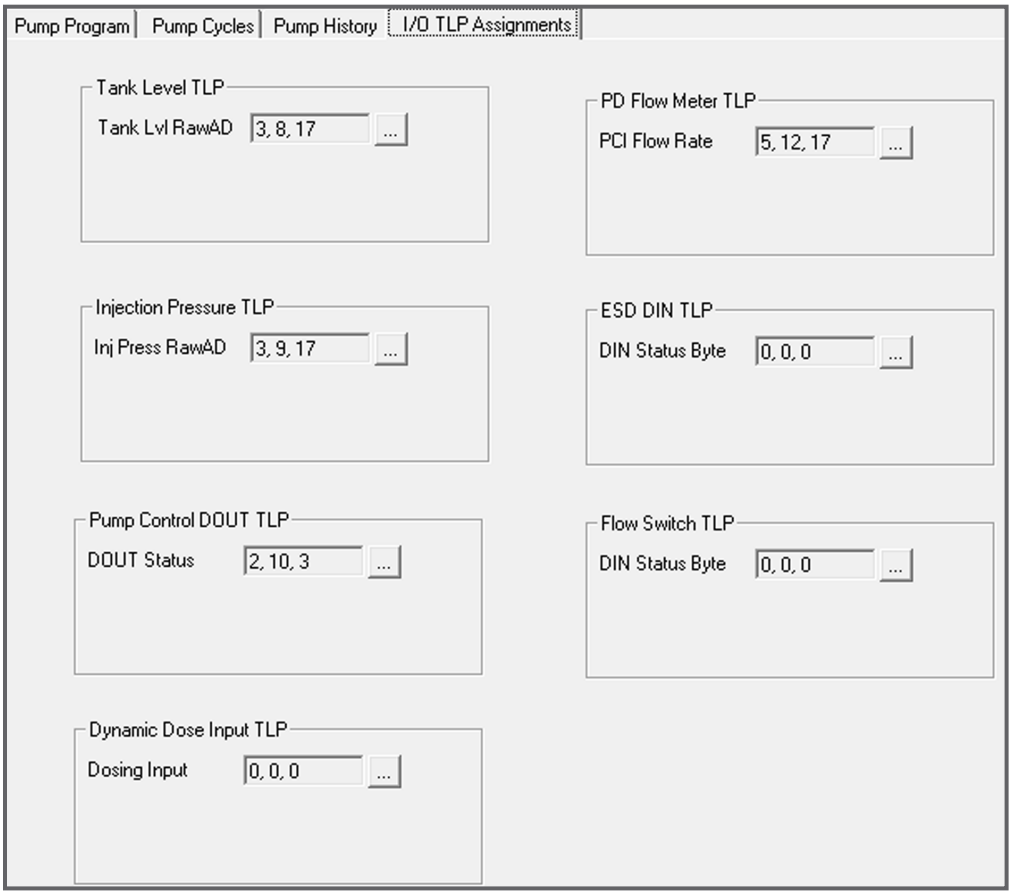


Figure 4.10 *I/O TLP Assignments Tab*

Field	Function
Tank Lvl RawAD	TLP point selected for the Tank Level transducer
Injection Pressure TLP	TLP point selected for the Injection Pressure transducer.
Pump Control DOUT TLP	TLP point for Digital Output control of the pump.
PD Flow Meter TLP	TLP point for Pulse Input for the positive displacement pump.
ESD DIN TLP	TLP point for Digital Input for Emergency Shut Down.
Flow Switch TLP	TLP point for Digital Input of Flow Switch.
Dynamic Dosing TLP	TLP point for User Defined Input. Must be float data-type.

5 Common Tasks

The following activities facilitate operation and maintenance of the EFM through iChem ROC 107.

5.1 Viewing History and Events

To view the Event Log:

1. Click **View>Alarms**.
2. Select **From Device** or **From File** to view the **History**, **Alarms**, or **Events** log.

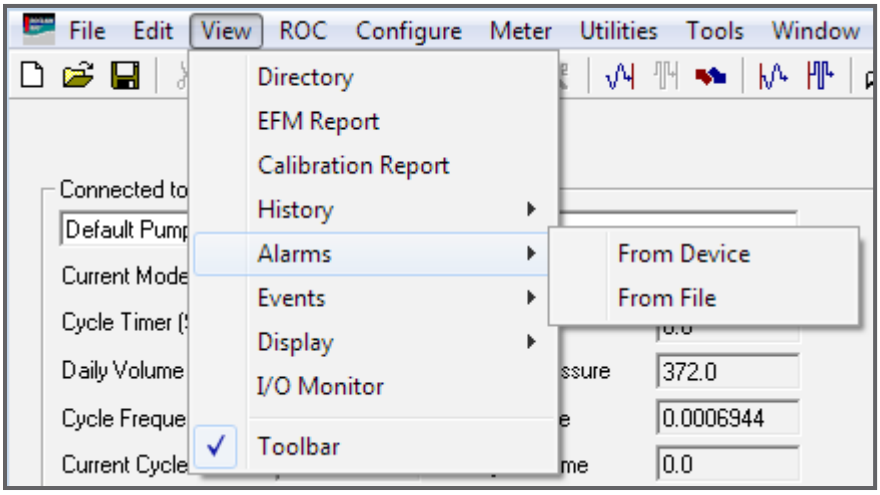
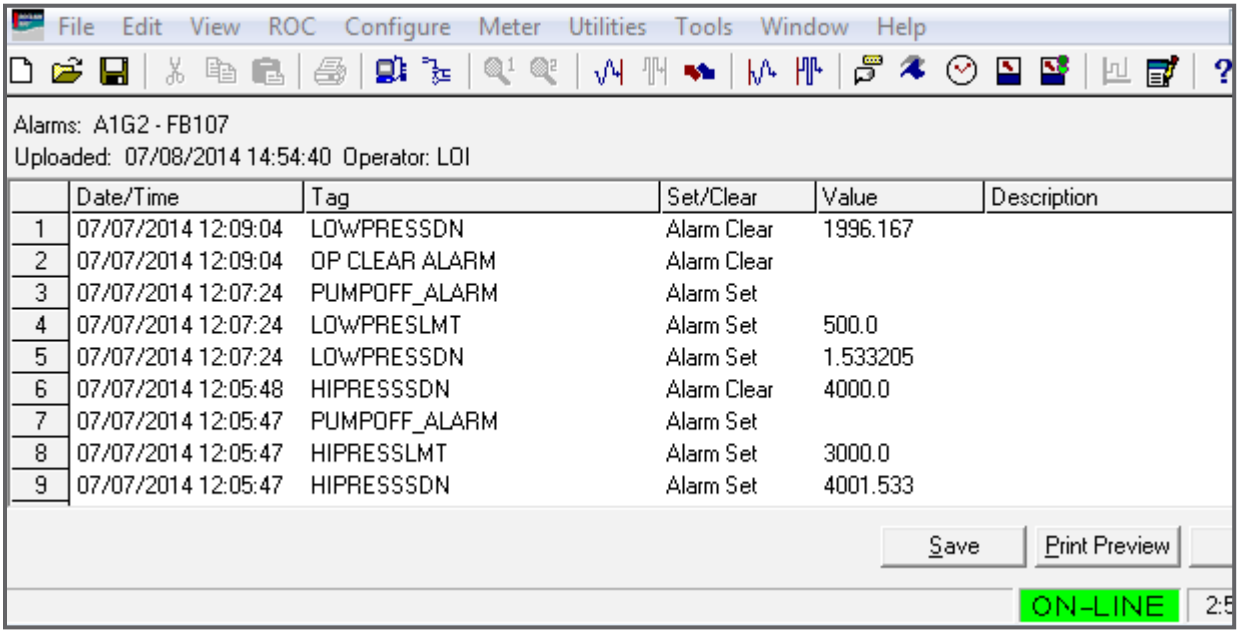


Figure 5.1 *View Alarms Menu Path*



	Date/Time	Tag	Set/Clear	Value	Description
1	07/07/2014 12:09:04	LOWPRESSDN	Alarm Clear	1996.167	
2	07/07/2014 12:09:04	OP CLEAR ALARM	Alarm Clear		
3	07/07/2014 12:07:24	PUMPOFF_ALARM	Alarm Set		
4	07/07/2014 12:07:24	LOWPRESLMT	Alarm Set	500.0	
5	07/07/2014 12:07:24	LOWPRESSDN	Alarm Set	1.533205	
6	07/07/2014 12:05:48	HIPRESSSDN	Alarm Clear	4000.0	
7	07/07/2014 12:05:47	PUMPOFF_ALARM	Alarm Set		
8	07/07/2014 12:05:47	HIPRESSLMT	Alarm Set	3000.0	
9	07/07/2014 12:05:47	HIPRESSSDN	Alarm Set	4001.533	

Figure 5.2 *Sample Alarms Log*

5.2 Clearing Alarms

To clear alarms and restart the pump:

1. Click the **Clear Alarms** button in the **Current Alarms** panel.

Figure 5.3 *Alarms Panel*

2. Then, click **Update**.

> **NOTE** *Alarms can also clear automatically. For example, the alarm will trigger if the injection pressure dips below the low alarm level. If the injection pressure then rises above the low alarm level, the alarm will automatically clear.*

5.3 Running Custom Batches

1. In AUTO or Manual mode, enter the volume to be injected immediately in the Batch Vol. field.
2. Click the Custom Batch Start button to begin the batch injection. The Pump Status panel updates as the batch runs.
3. If Enabled, Click Correction Batch Start button to begin the computed batch injection.

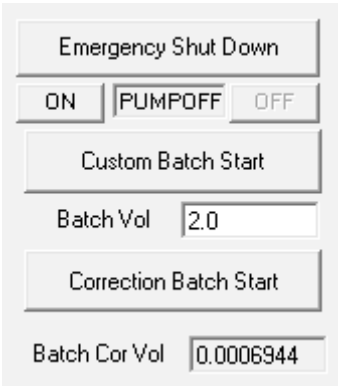


Figure 5.4 *Custom Batch Functions*

5.4 Creating a User-Defined TLP

Extended soft points allow users to define data types.

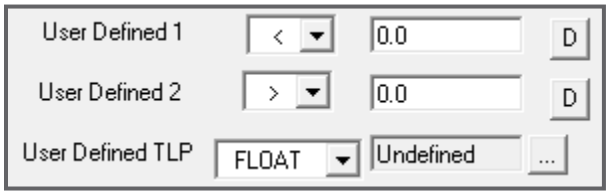


Figure 5.5 *User Defined TLP Functions*

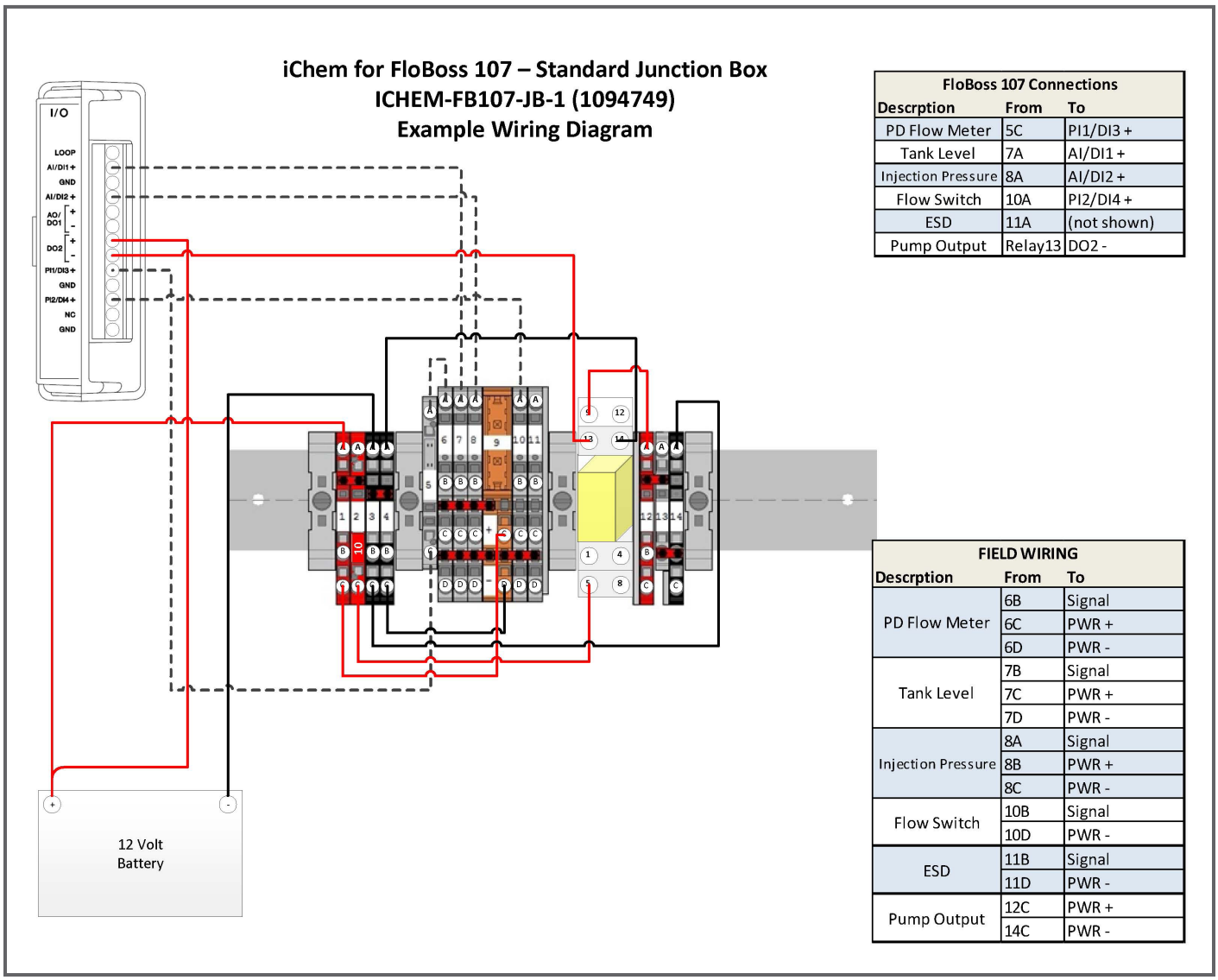
Users can set alarms and shut down the pump using any TLP point defined in the FloBoss 107.

1. Select and map the User Defined TLP point.
2. Match the TLP point to its data type.
3. Set up the warning or alarm levels as required.

Appendix A: Wiring Diagrams

A.1 iChem for FloBoss107 - Standard JB Wiring

The following diagram shows an example wiring configuration.



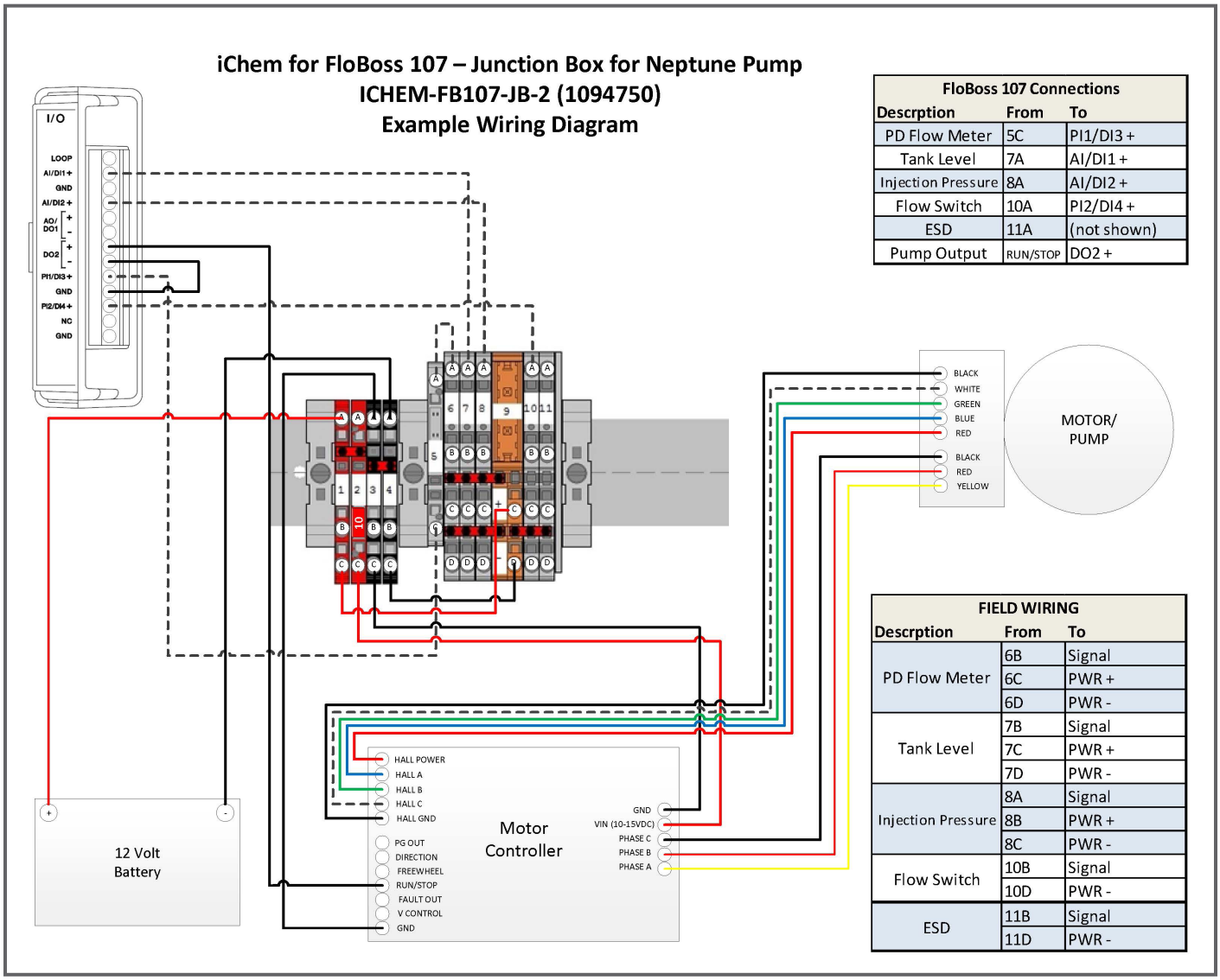
FloBoss 107 Connections		
Descrption	From	To
PD Flow Meter	5C	PI1/DI3 +
Tank Level	7A	AI/DI1 +
Injection Pressure	8A	AI/DI2 +
Flow Switch	10A	PI2/DI4 +
ESD	11A	(not shown)
Pump Output	Relay13	DO2 -

FIELD WIRING		
Descrption	From	To
PD Flow Meter	6B	Signal
	6C	PWR +
	6D	PWR -
Tank Level	7B	Signal
	7C	PWR +
	7D	PWR -
Injection Pressure	8A	Signal
	8B	PWR +
	8C	PWR -
Flow Switch	10B	Signal
	10D	PWR -
ESD	11B	Signal
	11D	PWR -
Pump Output	12C	PWR +
	14C	PWR -

Figure A.1 *Standard Junction Box Wiring Example*

A.2 iChem for FloBoss107 - Neptune JB Wiring

The following diagram shows an example wiring configuration using the Neptune Pump.



FloBoss 107 Connections		
Descrption	From	To
PD Flow Meter	5C	PI1/DI3 +
Tank Level	7A	AI/DI1 +
Injection Pressure	8A	AI/DI2 +
Flow Switch	10A	PI2/DI4 +
ESD	11A	(not shown)
Pump Output	RUN/STOP	DO2 +

FIELD WIRING		
Descrption	From	To
PD Flow Meter	6B	Signal
	6C	PWR +
	6D	PWR -
Tank Level	7B	Signal
	7C	PWR +
	7D	PWR -
Injection Pressure	8A	Signal
	8B	PWR +
	8C	PWR -
Flow Switch	10B	Signal
	10D	PWR -
ESD	11B	Signal
	11D	PWR -

Figure A.2 *Example Junction Box Wiring for Neptune Pump*

Appendix B: Troubleshooting and Known Issues

Problem: iChem will not license

Solution: Refer to Section 2.3

Problem: Pump will not start

Solution: Check wiring and refer to Section 3.1

Solution: Check operation and refer to Section 4.1

Problem: Pump starts, but no or Low Flow Detected

Solution: Check wiring and refer to Section 3.1

Solution: Check PD meter sensor is installed correctly

Solution: Isolate the PD meter and examine inside the PD meter gears for blockage or flaws